Investigating Australian and New Zealand Fairtrade representatives' and blockchain technology experts' attitudes towards blockchain technology as a potential to improve Fairtrade certification

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ABSTRACT

This thesis investigates New Zealand and Australian Fairtrade (FT) representatives' and blockchain technology (BCT) experts' attitudes towards BCT as a potential to improve FT certification. After reviewing literature on FT certification, their goals, benefits and weaknesses, a gap has been identified, as to the best of my knowledge academics have not yet recognised the extent to which BCT has the potential to improve FT's certification areas of weakness. Although it has been found that (agricultural) supply chains embedded in blockchain offer transparency, traceability and simplified supply chains (Baralla et al., 2018), there is no literature that provides insight into the way FT representatives view BCT as a potential to improve FT's certification.

Data was captured through qualitative semi-structured interviews with six New Zealand and Australian FT representatives and six BCT experts to gather their perceptions and attitudes towards the adoption of FT onto blockchain. Thematic content analysis was then utilised to determine participants' attitudes. Secondly, data was measured against the Technology Readiness Index to establish participant's readiness to adopt BCT.

This research produced a number of key findings, discussing participants' attitudes in relation to the impact that implementing BCT would have on FT certification and covering their readiness to accept and adopt BCT.

A range of implications and limitations for this research study is discussed further on, as well as the potential practical and theoretical contributions that can help FT understand BCT as a potential to improve FT certification. Followed by a number of opportunities for future research that can build on this research area.

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Michaela, what a saint you have been. I cannot imagine this process without you and I assure you it would not have been possible without you. Thinking back to when this all started I had never heard of blockchain technology before, and look where we are today. You gave me direction, constant support, endless words of encouragement, you were patient with me, you pushed me to do things I didn't think I was capable of and you helped me believe in myself. For that I am incredibly grateful for you. You have taught me so many wonderful things along the way and I will forever cherish this journey that we went through together. Thank you!

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GLOSSARY

Fairtrade: Fairtrade are a not-for-profit organisation who work directly with businesses and consumers to support the development of farmers and workers to have more control over their futures whilst protecting the environment that they live and work in (Fairtrade, 2019). They are an institutional arrangement constructed to help suppliers within developing countries obtain improved trading conditions (Lyon & Moberg, 2010). Beyond this they provide both direct and indirect support to farmers to deepen social and environmental sustainability (Fairtrade, 2020). Fairtrade is much more than just an organisation, they ensure social, environmental and ethical impacts, therefore improving human impact.

Fairtrade certification: In order for a product to become Fairtrade certified it must meet Fairtrade social, economic and environmental standards that are set by Fairtrade International. Fairtrade's certification label was developed as a third-party certification scheme that enforces standards for producers practices, and how much these producers should earn to ensure they receive a constant flow of income (Fairtrade, 2019) with an emphasis on considering farmers/producers first and taking an ethical point of view (Fairtrade, 2016).

Fairtrade goals: Fairtrade strives to improve prices, provide better working conditions, regional sustainability and fair trading among farmers and their workers within developing countries (Fairtrade Foundation, 2019). They promote fairness and justice in trade through increased transparency to provide assurance to customers that products labelled Fairtrade are Fairtrade (Fairtrade, 2019).

Blockchain technology: Is a decentralised ledger that stores data and information of transactions which is then made accessible to anyone. Once the data has been entered into the block it is unable to be tampered with, falsified or changed (Figorilli et al., 2018). Blockchain have the ability to record a growing list of information as a product moves from one step to the next along a supply chain all the way from the farmer to the consumer (Figorilli et al, 2018). It is anticipated that BCT is going to bring a revolutionary shift in the way that transactions are carried out in the supply chain (Kamble et al., 2018). It provides improved transparency and traceability by removing disadvantages of trust issues along the supply chain (Kamble et al., 2018).

CHAPTER ONE - INTRODUCTION

1.1 Overview

> "*Our mission is to connect disadvantaged farmers and workers with consumers, promote fairer trading conditions and empower farmers and workers to combat poverty, strengthen their position and take more control over their lives.*"
>
> (Fairtrade Foundation, 2020)

Fairtrade (FT) is a trading partnership dedicated to improving the lives of farmers and workers in the developing world through guaranteeing stable prices, fair working conditions and improved living conditions (Fairtrade, 2020). To achieve the financial objective of stable prices, FT introduced minimum price levels that farmers receive, which act as a safety net to ensure farmers would not earn less than what is needed for them to continue sustainable production, even when global prices for the commodity fall (Flocert, 2019). To achieve the social objective of improved living conditions, FT pays out price premiums to cooperatives which act in the best interest of the farmers' communities and invest the received moneys into healthcare, housing, education, community services projects, and as business investments.

FT international regularly measures and reports on their impact online and through annual reports that contain social and financial achievements. The organisation remains aware about aims that need further attention such as "… progressing faster towards a living wage in our Standards, doing more to extend Fairtrade's core work to farm workers, empowering women farmers and workers, tackling power imbalances in supply chains, building effective climate change resilience within communities and scaling up our work within countries." (Fairtrade Foundation, 2020). With respect to supply chain and financial imbalances, environmental resilience and sustainable processes, blockchain technology (BCT) has emerged as a potential enabler to assist in the solving of the persisting challenges. Particularly in supply chain contexts of agricultural commodities, BCT may disrupt the existing business arrangements through (1) improved transparency and traceability which is seen as a barrier to fairer trading arrangements (Egels-Zanden et al., 2014), and (2) eliminating some of the middlemen in the supply chains who are suspected to reduce the profits of the farmers (Omidvar & Giannakas, 2015) without endangering the efficient and effective functioning of

the supply chains. Point (1) is particularly relevant today considering the increased end-consumer awareness about the trail of the products which will relate to their readiness support the FT initiative.

My study therefore explores the perceptions and attitudes of New Zealand and Australian FT representatives about the benefits and hurdles of adopting BCT into the supply chains which FT is engaged in, and herewith support and achieve FT certification objectives. Thus, the research contributes to the more general issue of technology acceptance and adoption within socio-economic contexts. The success or failure of technology adoption in practical settings hinges on a mutual understanding of the intricacies within each domain. It is therefore important to also investigate what BCT experts have to say about why or why not BCT may achieve FT certification objectives.

The above research plan raises two issues. The first issue relates to theory: I analyse the acceptance/adoption issue using the Technology Readiness Index (TRI) that measures "people's predisposition to use new technologies" (Parasuraman, 2000, p. 308). TRI has often been used as a theoretical starting point (e.g., Kamble et al., 2019) within which the latent construct 'predisposition to use new technologies' is measured through indicators that categorise into optimism, innovativeness, discomfort and insecurity. The second issue relates to methodology: I interview two quite distinct groups of people, FT representatives and BCT experts, about one common theme. The literature (e.g., Sowell, 2010) has documented that an expert's knowledge outside of their particular domain may be limited. Table 1 shows the expected levels of knowledge between the two groups and the respective knowledge domains. A first research task is then to query whether the hypothesised levels of knowledge hold up in my sample. This testing of the actual levels of knowledge will thus be the subject of the introductory question in my interviews. Arguably, it is more important to assess how much FT representatives know about BCT, because it is the latter that may disrupt FT's current processes and operations. Stated generally, the two options that FT representatives are faced with are to either continue with their program as is, or to adopt BCT for reasons discussed below. The role of BCT is an enabling role. Thus, FT practitioners would need to understand, accept and then adopt BCT, while the assumption is that BCT experts understand and accept BCT for it is their field. When it comes to adoption, it is debatable if BCT experts' level of insight into the receiving domain, such as for example agricultural supply chains, is correlated with the chance of successful adoption and integration of BCT.

Table 1.1: Expected knowledge levels of FT and BCT participants about the opposing domain

	Knowledge of FT	**Knowledge of BCT**
FT representatives	High	Low
BCT experts	Low	High

Based on the above motivation and introduction to my research, I investigate the following research question (RQ1):

RQ1: What are the perceptions and attitudes of FT representatives and BCT experts towards the adoption of BCT into the existing FT program with the aim to support and better achieve FT certification objectives?

To address RQ1, I adopt exploratory qualitative methodology using semi-structured interviews, participant recruiting strategy using LinkedIn, referrals and Google search, and thematic contents analysis. Further details in relation to RQ1 are discussed in this thesis as follows.

In Chapter Two I review the literature on FT, BCT and technology adoption, with a focus on the benefits and weaknesses of FT and BCT. In Chapter Three I discuss the methodology and provide an explanation and justification of the research design. In Chapter four I elaborate on the data analysis through the use of thematic content analysis and the Technology Readiness Index (TRI). In Chapter five I present the findings of my study, providing the perceptions and attitudes of Australian and New Zealand FT representatives' and BCT experts' in relation to the TRI. Lastly, Chapter six presents the discussion and conclusion. The discussion highlights the main findings and how it relates to past literature. Followed by the implications, research limitations, strengths of the study and opportunities for future research in this field.

CHAPTER TWO - LITERATURE REVIEW

2.1 Fairtrade

FT is an international social movement that is linked to the system of production and trade which is regulated by agencies that construct and audit certification standards (Clark & Hussey, 2016). The FT program is set in place to offer farmers and workers in developing countries improved prices and appropriate resources for social and environmental purposes (Milford, 2004). As of 2018, FT International is a program that assists 1.7 million farmers and workers across 73 different countries (Fairtrade Foundation, 2020). The structure of FT is organised through FT International which is the holding non-government organisation for 25 national FT subsidiaries which promote FT products to consumers, 3 producer networks and FLOCERT, an independent FT certification organisation. There are three main FT certification labels, including Fairtrade International, Fairtrade USA and Fairtrade for Life. FT International establishes standards which intention is that small-scale producers are put into a better position to manage the challenges on economic, social and environmental issues (cf, Table 2.1). Put more explicitly, FT certified producers (1) obtain a constant income which improves their financial position and allows for better mid-term planning on many aspects of life, (2) will be supported in their in economic development, for example, a significant portion of the FT premium is spent on agricultural tools and supplies, and (3) enabling investments to be made in health care, education, infrastructure and diversity in crops (Fairtrade, 2019).

Table 2.2: Aims of the Fairtrade International standards

Social development	Training opportunities, non-discriminatory employment practices, no child labour/forced labour, access to collective bargaining processes and freedom of association of the workforce, adequate occupational safety and health conditions and sufficient facilities.
Economic development	Buyers are required to pay FT Minimum Price (FMP) and/or a FT Premium (FP) to producers. The FMP enables producers to cover their costs of production and pay their workers sufficient wages. The FP is money to invest in improving the quality of lives among producers with a focus on health, education, environment and economy.
Environmental development	Environmental sound agricultural practices include requirements for; minimized and safe use of chemicals, waste management, maintaining soil fertility, water resources and no genetically modified organisms.

Data extracted from Fairtrade International (2019)

These standards are supported by global organisations which are communicated to consumers through product labels (Dzurilla, 2016). The standards encapsulate fairness and partnership in documents for suppliers and consumers (Fairtrade, 2016) as well as requiring farmers abide by environmental protection standards as they ensure for a more sustainable approach (Elder et al., 2012).

2.1.2 Impact of Fairtrade

2.1.2.1 Economic benefits

One of FT's main goals is to increase the financial security for farmers and ensure that they are less exposed to poverty (Fairtrade, 2016). Krumbiegel et al. (2018) for example found that hourly wages of workers on FLO-certified pineapple plantations in Ghana were higher than those for non-FLO-certified plantations. Krumbiegel et al. (2018) also documented higher incomes and reduced poverty for participants in coffee labelling schemes in Ethiopia from programmes such as the Rainforest Alliance and double FLO-Organic certifications.

FT's standards require payments for a Fairtrade minimum price (FMP) on most goods as well as a Fairtrade premium (FP). A FMP is established to ensure the cost of sustainable production, whereby if the market price for a good drops below a certain level, the farmers will not earn below this which ensures they receive a stable income (Fairtrade Australia New Zealand, 2016). On the other hand, the FP provides farmers with the opportunity to be able to make business investments, investments in the community and cover the cost of sustainable production (Fairtrade, 2016). The price paid to producers is on a case-to-case basis as it is dependent on the farmers average costs of production and what produce they are growing (FLOCERT, 2019). Table 2.2 presents the FMP and FP of coffee, cocoa beans, sugar, bananas and black tea, some of FT's most popular goods. This is monitored and audited by FLO-Cert to protect farmers from receiving prices lower than the market price, and as a safety precaution to ensure farmers receive a stable income (FLOCERT, 2019). A prime example of this was shown as the global price for Arabica coffee has frequently declined over 15 of the last 25 years to a point below the FMP, though the FMP has enabled farmers to continue earning a sufficient income to cover basic production costs (Fairtrade Foundation, 2020). Lastly, FT farmers are obligated to pay their employees' wages that are working towards living wages as a way of supporting workers' rights and aligning with FT's goals (Fairtrade, 2016).

Table 2.2: How much farmers are earning for a particular commodity in NZD

Commodity	**Fairtrade minimum price**	**Fairtrade price premium**
Coffee	$1.40/pound $1.70/pound (organic)	$0.20/pound
Cocoa beans	$2400/metric ton $2700/metric tonne (organic)	$200/metric tonne $300/metric tonne (organic)
Sugar	There is no FMP for sugar	$60/tonne $80/tonne (organic)
Bananas	FMP is set by region: $9.8/box (18.14kg) (Northern Colombia) $10.87/box (Ghana) $12.41/box (organic) (Ghana)	$1 per box, or $55 per tonne
Black tea	FMP is set by region: $2.40/kg (Sri Lanka) $2.00-$2.20/kg (India) $1.70-$1.80 (Kenya)	$0.50/kg

Data extracted form Fairtrade Foundation (2020)

As the FMP and FP varies between the type of produce and countries, it is evident from Table 2.2 that FT has a different level of impact on farmers, workers and their community around the world. Some farmers are thus reasonably positively, some even significantly positively, impacted as a result of participating in the FT program (cf, Table 2.3), while other farmers seem to be less fortunate (cf, Table 2.4, next section). For example, in Costa Rica, coffee farmers earned higher prices than non-FT coffee farmers, allowing them to have a stable income (Bowes, 2011). The Keto Tapasi community in Papua New Guinea has received reasonably positive impacts from partaking in FT, particularly with regard to the FP that has enabled them to invest in more efficient farming processes and into their community to be more resilient to future challenges (cf, Table 2.3)

Table 2.3: Farmers who were positively impacted by Fairtrade

Country	**Example**	**Level of impact**
Bangladesh	Producers are reaping positive socio-economic impacts, such as increased income and training from FT organisations (Kharel & Middendorf, 2015).	Reasonably positive impact
Papua New Guinea	4,500 farmers and workers in the Keto Tapasi community are seeing the benefits of selling FT goods. Farmers have enough of an income that it can be invested in machinery to improve their processes, reduced illiteracy and improve health care (Fairtrade, 2016).	Reasonably positive impact
Costa Rica	Producers in coffee plantations received higher returns, allowing for a stable income that positively impacts their families (Bowes, 2011).	Significant positive impact
Reasonably positive impact: FT farmers who earn an income above the FMP. Significant positive impact: FT farmers with reasonably positive impact and obtain benefits to the overall welfare for them and their families.		

2.1.2.2 Farms where FT economic benefits are not received

Despite the FT standards that are set, it has been found (Fairtrade, 2019) that some farmers who are part of the certification are not receiving the intended benefits. The level of impact that this is having on farmers is particularly detrimental and goes against FT's goals. For example, Johannessen & Wilhite (2010) have found that an abundance of farmers in the Dominican Republic have neither knowledge nor awareness of the FP. Consequently, farmers are earning well below what they should be, therefore, causing a flow on effect that does not enable farmers to make new investments, improve their working conditions, provide community development or increase financial security (Fairtrade, 2016).

Additionally, there are two issues surrounding the FMP. The amounts paid do not always allow a sufficient income to cover the costs of resources and production (Omidvar & Giannakas, 2015), and FT certification renewal costs (Baumann et al., 2012). The certification cost is a consistent issue for farmers who own small farms as their productivity levels are lower, resulting in reduced income levels and difficulty to afford the certification (Clark & Hussey, 2016). Secondly, the FMP for standard coffee is $1.40 per pound and the FP is $0.20 per pound,

although this is still not enough to meet the living wage, as farmers would need to be earning $2.00 per pound (Fairtrade Australia New Zealand, 2019). Evidently, farmers are receiving low wages resulting in insufficient income, with almost 61% of FT farmers selling coffee at a price below production costs, and with farmers income not increasing over the last 20 years, followed by an increase in farming costs, their real income has actually declined (Fairtrade Australia New Zealand, 2016). Hence, one of the expressed concerns by FT farmers are fair prices (Omidvar & Giannakas, 2015).

Another example is from the cocoa sector in the Cote d'Ivoire. In 2019, a cocoa farmer needed to earn US$1.20-1.50 per pound to break even (Fairtrade International, 2019). However, under FT certification only 12% of FT cocoa producers were earning enough to afford daily basics with 52% living in extreme poverty (below US$0.78 per day) as a consequence of global cocoa prices falling to around a US$1 per pound (Meemken et al., 2019). With respect to other produce, Weber (2011) concluded that FT coffee growers in southern Mexico were unable to improve their economic conditions through prices paid under the FT-certified program, and FT certification hardly affected workers' welfare (Mitiku et al., 2017). Therefore, it can clearly be stated that the benefits FT aspire to are inconclusive based on the above.

Table 2.4 gives an overview of studies which identified FT certification problems. Although many farmers are not receiving the intended benefits from FT the level of impact varies from one FT farming country to the next. I thus have categorised the studies into two groups with respect to the different levels of impact.

Table 2.4: Farmers who were not receiving the intended benefits from Fairtrade

Country	**Example**	**Level of impact**
Peru	FT income is not sufficient enough to cover the higher costs of production, labourers and intermediaries which in turn reduces quality of life (Ruben & Fort, 2012; Beuchelt & Zeller, 2011).	Significantly negative impacts
Cote d'lvoire	Cote d'lvoire is the largest producer of cocoa. Farmers required $1.20-1.5 per pound to afford daily necessities, however prices reduced to $1 per pound, left many in poverty (Meemken et al., 2019).	Significantly negative impact

Rwanda	FT coffee farmers are earning on average $1.4NZD per pound of coffee, in addition to a price premium of $0.20 per pound (Fairtrade Australia New Zealand, 2019) resulting in FT farmers earning less than non-FT cooperatives (Elder et al., 2012).	Significantly negative impact
Dominican Republic	Numerous FT farmers are unaware of the minimum prices, as well as the guaranteed premium of $1.75 per banana box (Johannessen & Wilhite, 2010).	Minor negative impact
Significantly negative impact: FT farmers who are receiving low wages as a result of FT certification. Minor negative impact: FT farmers who are being negatively affected but are not aware of it, therefore, the impact on them is minor		

2.1.2.3 Social benefits

FT International standards comprise of social development aims that provide a wide range of benefits with a focus on training opportunities and sufficient facilities. This has shown to be the case, for example, with women who have received more opportunities for employment and increased involvement in training programs in Wuyuan, China, and Kandy, Sri Lanka (Qiao et al., 2016). This in turn has shown to have positive flow on effects, whereby women have been able to earn a higher level of income which improved their overall welfare. As a result of the FP, many communities have reported that they receive the benefits from chosen investments and believe it is building a better tomorrow, particularly with respect to educational facilities and clean water, which aids to improved general health (Qiao et al., 2016).

Data published by Fairtrade International (2020) show a linear increase in the total FP that producers have received during the last decade from €51 million in 2010 to €176.8 million in 2018. With a 20% increase in premiums for 2019 the FT contributions are expected to keep increasing in the future. It is completely up to the community how they spend the received FP. For example, Santa Marta in Columbia built a football school, athletics club and additional activities for children to play in a safe environment, whilst other communities have used their premiums to build schools, water fountains and develop safe roads (Fairtrade International, 2020). In 2014, 42% invested their premiums in direct services for farmers, 47% was spent on investing in producer organisations, 9% on services for communities and 2% on what was classified as ‘other’ investments (Fairtrade International, 2020).

2.1.2.4 Criticism of social impacts

Much of the above information is self-reported by FT. As a result from the lack of income, Krumbiegel et al. (2018) report that FT farmers and their workers are struggling to improve their welfare (Omidvar & Giannakas, 2015). This has resulted in an extensive number of producers living in poverty (Bacon, 2005) particularly among small producer homes where individuals reported having to move social assets in order to cope with the deteriorating quality of life (Ortiz-Miranda, & Moragues-Faus, 2015; Utting, 2009). Additionally, working conditions often do not meet the required FT standards (Omidvar & Giannakas, 2015). Although this is not always intentional behaviour from producers that their working conditions are not up to FT standards, it may be a result from a lack of understanding of the FT standards and requirements (Valkila & Nygren, 2010). A lack of knowledge surrounding FP's has also taken a toll on farmers (Raynolds, 2009) as without an understanding of what the FP is, the premium may not be spent at all or unwisely.

2.1.2.5 Environmental benefits

FT strives to improve farmers working conditions, therefore, a farmer's environment is required to be clean, safe and healthy (Fairtrade, 2016). Environmental protection standards cover the reduction of greenhouse gas emissions, quality of soil and water, and pest monitoring (Fairtrade Foundation, 2019). More specifically, FT International prohibits the use of specific chemicals that are harsh on the environment in order to encourage farmers to preserve their land for farming healthy crops. Additional practices are prohibited when producing organic commodities, such as the use of all chemicals and cutting of protected forests (Fairtrade Foundation, 2020). Furthermore, the environmental standards encourage coaching for farmers, which include recommendations on eco-friendly practices, particularly with respect to the development of healthy soil and safe pest monitoring practices (Fairtrade Foundation, 2019). Such environmental measures promote sustainable agricultural practices by implementing principles that aim to regulate the use of pesticides, erosion of soil, high energy use and reduced greenhouse gases (Pyk & Hatab, 2018). As a result of these standards, numerous farmers have converted to eco-friendly pesticides for the benefit of the environment and their health as well as that of their workers (Fairtrade, 2016). Alternatively, many FT farmers went a step further and have made increased efforts to invest in organic production to reach more sustainable means of farming (Mook & Overdevest, 2018).

2.1.3 Criticism of Fairtrade

Despite the efforts that FT are making, the above contradiction in expectations, promises and actual events raise questions and some criticism of FT. On one side, the information provided by FT may be biased from insufficient and selective reporting. Below I discuss two areas which attracted attention by the media and academic work.

2.1.3.1 The issue of profit distribution

There are numerous issues associated with the monetary side of FT, with farmers receiving low 'fair wages', yet are forced to expend higher production costs which yields insufficient income to cover production and FT certification renewal (Omidvar & Giannakas, 2015). Additionally, the unequal profit distributions (cf, Figure 2.1) within the supply chains reduce the income of farmers due to large players at the end of the supply chain having the market power to demand higher prices (Chau et al., 2016; Hezarkhani et al., 2018). These agents can be identified in a typical coffee supply chain (cf, Figure 2.2) as roasters, grocery stores and coffee shops. Retailers in particular have the power to drive the efficiency and scalability of the supply chain (Kravitz, 2017; Kumar et al., 2014). Thus, FT benefits are not always fairly distributed between all agents in the supply chain, leaving many producer households with reduced income (Baumann et al., 2012), which in turn has negative impacts on their welfare.

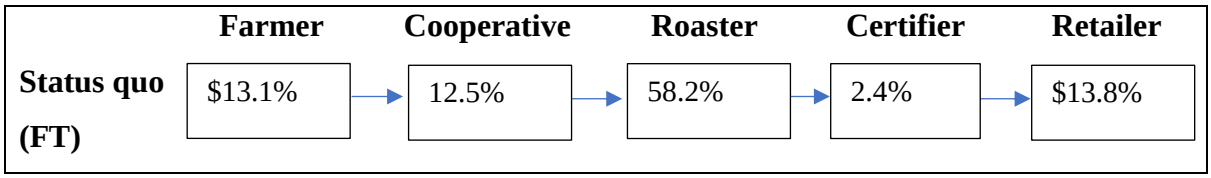

Figure 2.1: Distribution of profits along a Fairtrade supply chain in Norway

Data extracted from Naegele (2020)

Within the FT coffee industry in 2010, $7 billion worth of profits was received among the 25 million farmers in the producer country, whilst $48 billion worth of profits is reaped in consumer countries through retailers such as supermarkets and coffee shops (Omidvar & Giannakas, 2015). Naegele (2020) reports that from the FT coffee sold and consumed in Norway, 70% of the proceeds remained in the consumer country while only 30% from the proceeds for conventional coffee remained in the consumer country.

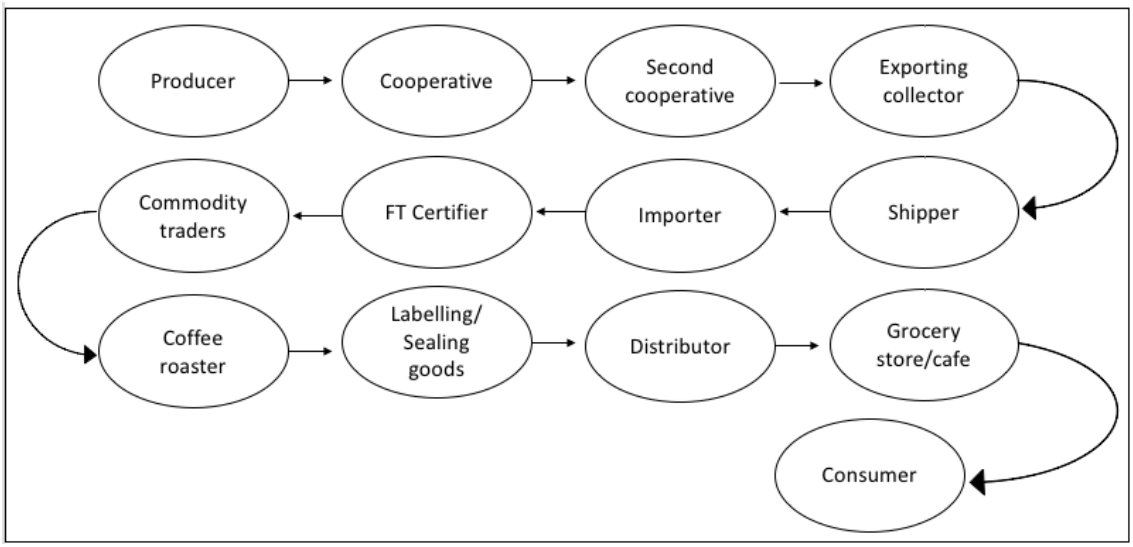

Figure 2.2: A typical FT coffee supply chain

Data extracted from Fairtrade International (2020)

In conclusion, for the FT program to improve their relevance, it is desirable that the distribution of money along the supply chain is 'fairer' (Olsson et al., 2013). One such 'fairer' approach would be to make the profit distributions proportional to the value contribution of each agent.

2.1.3.2 Lack of transparency and traceability

The implementation of a 'fairer' profit distribution may be the result from a lack of traceability and transparency along the supply chain. Traceability in the agricultural sector has been defined as the capturing of information at each individual point of the supply chain, including the production, export, processing, import and handling (Smith, 2018). In practice however, Fairtrade International (2020) have stated that "tracking products along every stage of the supply chain can be difficult and costly" particularly among cocoa, tea, sugar and fruit juices. Consequently, producers are not declaring the full scope of their practices as it increasingly difficult and can reduce farmer's sales (Fairtrade International, 2020). Agricultural supply chains have been identified with issues such as data invisibility, tampered information and sensitive disclosure of data (Lin et al., 2019). Therefore, FT is faced with a credibility gap due to impeded information sharing (Parreño-Marchante et al., 2014). As a consequence, it is difficult to distinguish between those producers who achieve the minimum certification requirements against those producers and companies which extend their efforts to be socially responsible (Tallontire, 2009). If there was an opportunity for full information access and disclosure in the supply chain, data claims would be well established (Bertino et al., 2019).

Ethical certifications such as FT are heavily reliant on ethical consumers as they adhere to the same values. Clearly, poor information sharing with consumers will not entice purchases of ethical products and devalue the socio-ethical claims of organisations that are unable to provide evidence that support what they are doing to in relation to their certification schemes (Tregidga et al., 2019). On this note, transparency has been suggested to be a desirable characteristic in the supply chain (Egels-Zanden et al., 2014) as it declares what is happening at each step along the supply chain (Neves & Vaccaro, 2013). With a lack of transparency comes a lack of distrust concerning crucial stakeholder relationships, particularly when investors and the public are involved (Williams, 2005). A lack of transparency also results in challenging international relationships (Linton, 2012), as well as damaging sustainable supply chains which businesses are demanding, leading to increased rates for socially irresponsible behaviour (Egels-Zanden et al., 2014). Transparency extends further to the whole supply chain, whereby all producers can "declare the truth" (Neves & Vaccaro, 2013) by publishing suppliers' names, sustainability conditions of their suppliers and practices they undertake in purchasing (Egels-Zanden, 2014). Therefore, transparency is not only a producer's issue but extends to the whole supply chain, whereby, a lack of knowledge throughout the market is a result of a lack of transparency (Johannessen & Wilhite, 2010).

2.1.4 Conclusion on Fairtrade certification

From an overview of the literature it is evident that FT are doing work to help support the lives of those living in third world countries through improving their social, economic or environmental conditions. The main mechanism to do so are the economic benefits that FT are providing: FMP's and FP's (Fairtrade, 2019). Providing a financial safety net allows community investments that provide clean water, education and infrastructure and hereby improving social conditions also (Jena & Grote, 2017). FT also have environmental standards in place that restrict and ban the use of certain chemicals to help sustain the environment and reduce farmers' exposure to chemicals (Fairtrade, 2016).

Regardless of these efforts, a number of weaknesses have been identified with FT certification. These include low wages that farmers are receiving with many still remaining in poverty (Meemken et al., 2019), unfair wealth distribution in the supply chain, particularly at the consumer end where the larger and economically more powerful agents have a high bargaining power (Omidvar & Giannakas, 2015). The lack of transparency and traceability

(Egels-Zanden et al., 2014) impede certification control and communication of supply chain information to ethically sensitive consumers.

In the next section, I will argue that BCT may provide FT with the opportunity to improve in the identified areas of weaknesses. What potential does BCT have to increase transparency and traceability along the supply chain and enable a wealth distribution system according to which agents may be assessed according to how much value they add to the supply chain?

2.2 Blockchain technology

BCT is a distributed ledger that has the ability to timestamp and record a growing list of data between peers in a permanent, 'incorruptible' and trustworthy way (Figorilli et al., 2014; Li & Wang, 2018). This is achieved as blockchain does not require third-party intermediaries (Swan & de Filippi, 2017). Information that is displayed in a block is not owned or regulated by a single agent. Once the information is placed in the block it is not easy for the data to be changed, tampered with or falsified (Figorilli et al., 2018; Naidu et al., 2018; Niu & Li, 2019).

In a blockchain, the full extent of goods along the supply chain can be tracked as data and information are stored and shared in a linear form **(**Galvez et al., 2018). This provides a more efficient and effective way to provide transparency and traceability along the supply chain (Baralla et al., 2020). Therefore, guaranteeing the originality of a given product in a transparent way at each step all the way from producer to consumer (Baralla et al., 2020) enables trust through a robust system (Galvez et al., 2018). The data is then able to be dispersed to allow individuals access to the information (Mackey et al., 2019) which can be achieved without trusted authority (Galvez et al., 2018) making it a game changer (O'Leary, 2017).

2.2.1 Existing BCT in the food sector

Despite FT's global recognition and praise for their attempt to improve prices, provide better working conditions, regional sustainability and fair trading among farmers and their workers within developing countries (Fairtrade Foundation, 2019), there are also a number of weaknesses associated with FT's organisation as previously mentioned. There are numerous other organisations who have also identified similar weaknesses and implemented BCT as a means to improve in these weak areas.

For example, there is Google's Certificate Transparency (CT). CT works by adding additional security walls, without being a disruptive technology (Madala et al., 2018). It implements a chain of trust by providing the certificate authorities system (third parties) with a supportive layer to their additional processes (Madala et al., 2018). Another approach that was introduced in 2018 was AgriBlockIot, also known as Agricultural Blockchain Internet of Things. AgriBlockIot works by storing data and information along the whole supply chain from producer to consumer, with an end goal of guaranteeing transparent and auditable traceability in assets (Caro et al., 2018). This approach focuses on integrating the Internet of Things and BCT to create a transparent, trustworthy and auditable records that can essentially create a traceable system for agricultural foods (Caro et al., 2018). This traceability system is based purely on Hazard Analysis, Critical Control Points and traceability, therefore, making it an adaptable system that can be implemented into existing software (Caro et al., 2018; Zhao et al., 2019). A similar approach was executed in 2016, when company AgriDigital sold 23.46 tons of grain using BCT. Since then, an excess of 1.6 million ton of grain has been sold with 1300 users, involving $360 million in grower payments (Kamilaris et al., 2019). As AgriDigital has proven to be a success, it now serves as a prime example that there is potential for BCT to be used in the agricultural sector. A further example is iFinca, a mobile app that uses BCT to provide verification, data security and accuracy through a transparent supply chain (iFinca, 2020). With iFinca users can see the authenticity behind each individual coffee cup, access data in a trusting way, trace the origin of the coffee from the farm to the cup in front of them and know that farmers are being paid an ethical amount (iFinca, 2020). iFinca empowers and builds more ethical supply chains, connects consumers with farmers, bridges the information gap and shares accurate data (iFinca, 2020).

There are also many BCT adoption reports in the media, however a recent review from Holm & Goduscheit (2020) on successful BCT adoption cases (measured on a 9-point technology readiness level scale) which are documented in the academic literature, had no mention about BCT adoption, or attempts thereof, within the FT space. Of the 33 cases identified, only 3 are related to food supply chains, while most have been developed within financial and trading contexts. These findings emphasise that the FT and BCT connection that I analyse in my thesis are at an early stage of academic attention.

2.2.2 Barriers and challenges of BCT

It needs to be noted that although BCT has the potential to improve FT from the positive review above, research firm Gartner reports that 90% of BCT-based supply chain projects will potentially fail, mostly because their usefulness and added-value have not been demonstrated (Jacobson, 2019). There are a number of issues and challenges that may have led to these failed attempts of implementing BCT. Some of these limitations include privacy issues, the cost of adopting BCT, human error, lack of trust, high uncertainties, lack of advanced technology in developing countries, privacy issues, lack of knowledge, accessibility and technical challenges (Kamilaris et al., 2019). To present a further understanding of the technologies limitations, the most significant barriers/limitations are discussed as follows:

Lack of knowledge: According to Sadhya and Sadyha (2018) the complexity of this advanced technology has resulted in many lacking an understanding of BCT. This has led to many not understanding the full potential that BCT has, or alternatively organisations being reluctant to adopt the technology. Additionally, resulting in many uncertainties about the possibilities that BCT can offer.

Lack of trust: Despite BCT having the ability to increase transparency of data, this does not mean the data being shared is accurate. Inaccuracy may be due to human error or wilful manipulation. The purpose of a blockchain is to store data, it does not validate information entered onto the blockchain (Galvez et al., 2018).

Lack of advanced technology in developing countries: The difficulty in developing countries is that farmers main priority is their crops, therefore, they devote all of their time to their farm and do not tend to have experience with "cutting edge technologies" (Sadhya & Sadhya, 2018). Furthermore, access to the technology that is required for BCT systems may be difficult.

Privacy issues: As transactions are recorded and stored on a centralised platform, users' privacy is not protected as individuals can be recognised by their public keys (Macket el al., 2019). Therefore, this leads to security issues along the supply chain (Balzarova & Cohen, 2020).

Implementation costs: The initial start-up costs of blockchain are rather substantial due to the level of complexity. Although it is difficult to narrow down the exact cost of BCT as this technology is adopted for numerous different requirements, costs vary substantially (Sadhya & Sadhya, 2018). To obtain an understanding of the implementation costs, consulting agency EY (EY, 2019) has published BCT implementation and running costs for four scenarios that would cover most BCT adoption scenarios in practice. Over a five year period, all of the four scenarios

cost at least $200,000 per annum. The on-going BCT maintenance costs are fairly stable at nearly $150,000 which in year one is complemented with so-called 'on boarding costs' of more than $100,000 depending on the technological features of the blockchain and expected daily transactions. For a 250,000 daily transactions with transaction sizes over 500 bytes blockchain implementation, EY estimates the total cost for a five year period at $1,115,000.

If FT was to implement BCT, this will result in increased costs that need be paid. FT will thus increase their percentage share from the supply chain profits to cover the initial on boarding costs and ongoing maintenance cost (cf, Figure 2.3). This raises two important questions:

(1) How much will the BCT cost and what percentage of profits will be paid to FT along the supply chain? And

(2) Will the benefits from implementing BCT outweigh the costs?

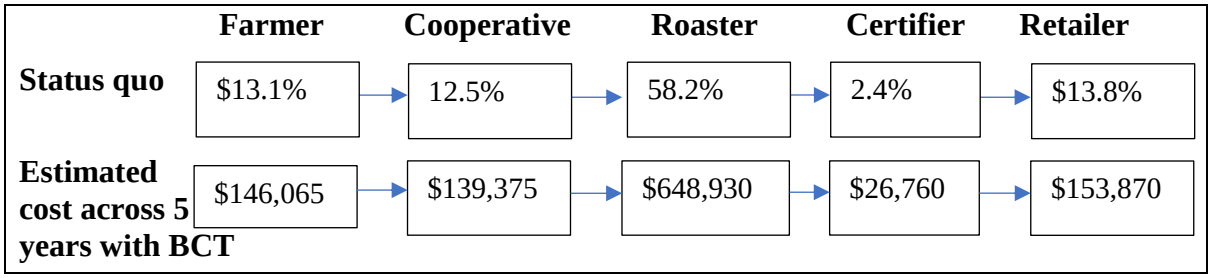

Figure 2.3: Distribution of costs along a Fairtrade coffee supply chain utilising BCT

Assuming that the BCT implementation costs would be shared by all the actors within the supply chain in the same way as profits are distributed, one can estimate the operational cost increase over the period of five years in the manner that is captured by Figure 2.3. This, however, is an assumption only and one needs to acknowledge negotiations amongst all actors in the supply chain and the possibility in different ratios that could further disadvantage the farmers or the original producers.

The barriers and challenges listed above give me material with which I can address the research tasks set in this thesis. Explicitly, I used the identified barriers and challenges that FT would have to face if they were to adopt BCT in the future (if they decided to do so) to develop Interview Question four:

"With the possibility of adoption of blockchain technology, what challenges and barriers do you foresee?"

2.2.3 How BCT has the potential to help improve FT

2.2.3.1 Increased transparency

Data transparency is defined as "the ability of a subject to effectively gain access to all information related to data used in processes and decisions that affect the subject" (Bertino et al., 2019). As many organisations are directing their business towards more transparency (Linton, 2012), BCT offers a potential solution for this to be achieved (Nugent et al., 2016). BCT provides businesses with the opportunity to track the full extent of the supply chain whilst establishing links between the process that particular goods undergo at each stage of the supply chain (Figorilli et al., 2018; Van Rijmenam & Ryan, 2018). As a result, transparency encourages improved flow of information and adds value to the supply chain (Čuš-Babič et al., 2014). With improved information sharing providing a transparent supply chain this could be beneficial for FT as it would help establish data ethics claims (Bertino et al., 2019), whereby FT can provide the public with information to show that their claims stand and are well established. Such dynamic transparency incorporates the aspect of corporate social responsibility (CSR) through collaboration of producers and stakeholders (Vaccaro & Madsen, 2009). More so, CSR has continued to progress as it reaches all elements of the supply chain including producers, logistics and consumers (Mejias et al., 2016).

2.2.3.2 Increased traceability

Traceability is frequently said to be an indicator of reducing supply chain costs, improving productivity rates and enhancing consumer food safety (Smith, 2018). BCT promises food safety traceability (Caro et al., 2018) through shared information and knowledge that is codified (Gereffi et al., 2005). More specifically, BCT works by exposing decentralized traceability systems to make all data available **(**Lee et al., 2012; Nene et al., 2019) using a chronologically ordered systems to share information in a linear form **(**Galvez et al., 2018). In addition, BCT uses an online system to ensure shared information is completely transparent and verified. A new block is unable to be constructed until there is full transparency among the previous blocks. The advantages of providing a traceable supply chain are highly beneficial for producers, consumers and all logistic producers in between. Table 2.5 illustrates potential beneficial advantages of adopting BCT by making a comparison with a traditional traceability system.

Table 2.5: Comparison between blockchain technology and a traditional traceability system

Comparative items	**Traceability system based on blockchain technology**	**Traditional traceability system**
Data authenticity	It is increasingly difficult to tamper with data, although if it is tampered with the changes are easily able to be identified and by who.	The data can be tampered with in the background
Data security	Distributed multi node complete data storage	Single centre node data storage
Government regulation	The data is synchronously stored in blocks along the supply chain	Can't trust the authenticity of the traceability data
User perception	The information of the traceability scene can be verified	Unreliable information

Source: (Li & Wang, 2018)

2.2.3.3 Simplified supply chains

BCT has the ability to reduce the number of middlemen in supply chains and bring into place a simplified supply chain (Caro et al., 2018). Shortening the supply chain can bring financial benefits to the producers by reducing the number of middlemen, in turn increasing profits for farmers due to fewer intermediaries (Fayet & Vermeulen, 2014). Furthermore, operational efficiency is also achieved as automatically matching data in real time, avoiding duplication and manual checks, document processing has been shown to be reduced to a fifth of the time **(**Hezarkhani et al., 2018). Caro et al. (2018) documented that BCT offers a simplified supply chain using peer to peer transactions all the way from producer to consumer.

2.2.3.4 Meeting increased "Fair trading demands"

As consumers are becoming more conscious of their purchasing decisions, the demand for CSR and fair-trading has increased (Wu et al., 2017). 88% of consumers believe that businesses should achieve their goals while improving society and the environment and 83% perceive that businesses should support charities (Wu et al., 2017). Therefore, FT are in a prime position as their whole purpose is to support society and the environment whilst making further contributions to support farmers and workers in developing countries. Such demands for CSR include the need for improved financial reporting (Maloni & Brown, 2006), incorporating

environmental and labour standards on poor developing countries (Bhagwati, 1995). These socially responsible practices are being demanded in order to further reduce the negative environmental and social impacts of supply chains (Fayet & Vermeulen, 2014). Subsequently, these pressures from consumers encourage organisations to change their operations (Fayet & Vermeulen, 2014) to become more transparent, provide more data and information to improve traceability and submit regular sustainability and financial reports (Caro et al., 2018).

2.2.3.5 Food integrity

Food integrity is defined as a trustworthy supply chain that works to trade food along the supply chain and prevent food fraud (Wang et al., 2017; Ruth et al., 2017). Wang et al., (2017) further specify food fraud as dishonest practice of production or supplying of food which intentionally works to benefit the producer and disadvantage the consumer. Food fraud has the potential to be mitigated through the use of BCT supply chains as it continually presents transparency throughout the whole supply chain (Wang et al., 2017). For example, Coca-Cola have taken steps to implement BCT in order to determine where forced labour is occurring at specific stages of the sugarcane supply chain (Chavez-Dreyfuss, 2018). Followed by a World Wildlife Foundation (WWF) that reported they would be implementing BCT supply chains as a way to eradicate illegal tuna fishing (WWF, 2018). The WWF intends to use radio-frequency identification to tag and scan the codes of fish to provide transparency and share with consumers exactly where their fish has come from. Another example is European grocers Carrefour who have introduced BCT as a way to establish standards and trace the process in which food has followed along the supply chain, covering all food categories, from fruit, vegetables, meat, poultry and dairy products (Carrefour, 2018).

2.2.4 Conclusion on BCT

Based on the discussion above, BCT can provide FT with an increased level of transparency and traceability with the chance to track the full extent of the supply chain. This further provides improved information sharing which is important for FT as consumers are interested to know that FT are upholding their claims. Alongside this, BCT works on a peer to peer system offering simplified supply chains, meeting ‘fair trading demands’ and improve food integrity. Therefore, based on literature and previous successful approaches of adopting BCT, there is potential that BCT has the ability to help improve FT certification.

2.3 Technology Readiness Index

Most of my question that I have prepared for the interviews are based on the theoretical framework of technology adoption models. The main questioning line that corresponds to the research task of my thesis is the attitudes and perceptions of FT representatives and BCT experts on the pros and cons of BCT integration into the FT and their certification programmes. The TRI is thus a fitting theoretical framework which is a measure of one's willingness to implement and utilise a new technology (Kamble et at., 2019). The 'willingness to implement and utilise a new technology' is a latent construct. Within the TRI framework a number of indicators have been derived which measure the construct. The indicators can express positive and negative views which are categorised into four groups: optimism, innovativeness, discomfort and insecurity. The first two groups are so-called motivators and the latter two groups are so-called inhibiters. Parasuraman & Colby (2015) provided the following definitions for all four concepts:

- Optimism: Perception that it provides heightened "control, flexibility and efficiency";
- Innovativeness: Desire to be a pioneer in the technology field;
- Discomfort: A sense of a lack of control and feeling overwhelmed by the technology; and
- Insecurity: Distrust and suspicion towards the technology and its capabilities.

The concepts described above influence the impact of technology readiness and perceived ease of use, therefore, echoing one's behaviour towards a new technology. Chotijah & Retrialisca (2020) represent the TRI framework with a path model which shows that all four TRI concepts will contribute to 'perceived ease of use' and 'perceived usefulness', which in turn will influence a 'behavioural intention'.

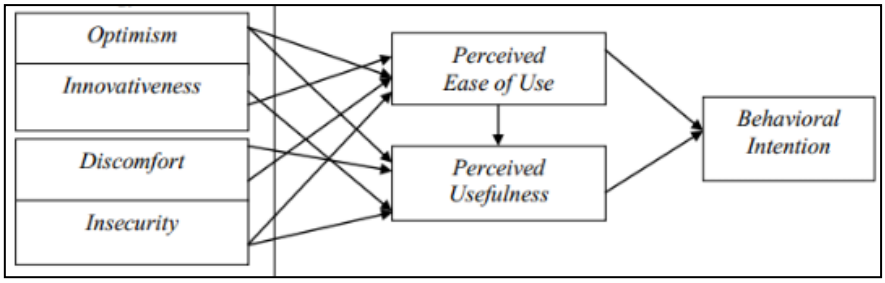

Figure 2.4: Technology Readiness Index model

Source: (Chotijah & Retrialisca, 2020)

The TRI has been integrated into a number of studies in order to gather the acceptance of new emerging technologies. For example, in the case of adopting BCT in supply chains in an Indian context, Kamble et al., (2019) utilised the TRI as their study aimed to "address the research gap by understanding the BCT adoption process in supply chains". The research findings indicated that TRI concepts did not significantly influence individuals' behaviour towards the adoption of BCT and should therefore not be given importance.

Another study undertaken by Chotijah & Retrialisca (2020) also incorporated the TRI model to assess the readiness of adopting Information Technology (IT) among small to medium size furniture businesses in Indonesia. The study concluded that businesses held a level of discomfort and insecurity towards IT, although their positive views override their negative views and businesses were ready to adopt IT. A last example of where the TRI was used is Kuo et al. (2013) who assessed nurses' readiness to adopt mobile electronic medical records. The results from the study reported that nurses expressed optimism, innovativeness and security towards the technology, although there was still a level of discomfort.

2.4 Summary: From theory to questionnaire

Table 2.6 presents a summary of the main identified areas of weakness within the FT programme, supplemented by some of the more important evidence from my literature review. Then, I have associated the weaknesses with the potential capabilities from BCT and derived suggestions on the potential to help improve FT certification. This line of argumentation lead to the development of the interview questions.

Table 2.6: FT and BCT comparison leading to the development of interview questions

FT areas of weakness:	**How BCT deal with the weakness:**	**Development of research question:**
(1) Monetary issues surrounding low wages for FT workers →Only 12% of FT cocoa producers were earning enough to afford daily basics in the Cote d'Ivoire (Meemken et al., 2019). → FMP for coffee is $1.40 per pound and the price premium is	→ There is potential to mitigate food fraud as a result of adopting BCT as there is complete transparency all the way	<u>Interview Question 2:</u> What outcomes would you anticipate as a result of BCT adoption into the FT program and into its certification process?

$0.20 per pound although this is still not enough as farmers would need to be earning $2.00 per pound in order to earn a living wage (Fairtrade Australia New Zealand, 2019).	back to the producer (Wang et al., 2017). → Data claims (such as the wages of FT farmers and their workers) will be established and supported with the use of BCT (Bertino et al., 2019).	
(2) The social impacts that low wages have on FT workers → Farmers are struggling to improve their welfare with many remaining in poverty (Krumbiegel et al., 2018) → In Cote d'Ivoire, 52% live in extreme poverty as a result of earning below US$0.78 per day (Meemken et al., 2019).	→ Increased transparency and traceability will show exactly when and where FT farmers are not receiving sufficient income and who is living in poverty, therefore, showing where FT are not upholding their claims to support fair wages	<u>Interview Question 2:</u> What outcomes would you anticipate as a result of BCT adoption into the FT program and into its certification process?
(3) An extensive number of middlemen in the supply chain reaping the benefits → In the coffee industry in 2010 $7 billion worth of profits was received among the 25 million farmers in the producer country, whilst $48 billion worth of profits was received in the consumer countries (Omidvar & Giannakas, 2015). → FT benefits are not always fairly distributed between the middlemen, leaving many producer households	→ BCT uses peer to peer transactions all the way from the producer to the consumer, in turn providing a simplified supply chain (Caro et al., 2018).	<u>Interview Question 3:</u> What impact on the middlemen do you foresee as a result of the implementation of BCT into the certification process of FT program along the supply chain?

with reduced income (Baumann et al., 2012).		
(4) A lack of transparency along the supply chain → Non-transparent FT is resulting in a lack of data sharing and information on where and how farmers are conducting practices and to what extent they are abiding the certification (Egels-Zanden et al., 2014).	→ BCT provides the opportunity to track the full extent of the supply chain whilst establishing the process that goods go through at each stage of the supply chain (Figorilli et al., 2018). This has the potential to help FT establish data claims through improved information sharing.	<u>Research question 4:</u> What challenges/ barriers do you foresee in relation to an adoption of BCT by FT, if any?
(5) A lack of traceability along the supply chain → FT endures a credibility gap due to a lack of data and information sharing (Parreño-Marchante et al., 2014) leaving no scope for determining the certification and those who only achieve the bare minimum requirements, versus those companies which extend their efforts to be socially responsible (Tallontire, 2009).	→ BCT guarantees food safety traceability through enhanced information sharing (Caro et al., 2018). This information is exposed along a chronologically ordered system that is entirely traceable and verified **(**Galvez et al., 2018).	<u>Research question 4:</u> What challenges/ barriers do you foresee in relation to an adoption of BCT by FT, if any?

CHAPTER THREE - METHODOLOGY

3.1 Introduction

This study aims to fill the gap identified in the literature review which is to investigate FT Australia and New Zealand representatives' and BCT experts' attitudes towards BCT as a potential to improve FT certification and better achieve FT objectives. In this research question, improving the FT certification through BCT relates to the following four weaknesses identified:

(1) Monetary issues surrounding low wages for FT workers;
(2) The social impacts that low wages have on FT workers;
(3) An extensive number of middlemen in the supply chain; and
(4) A lack of transparency and traceability along the supply chain.

Based on the above, the context of my research is of exploratory nature, and I use qualitative research within an interpretivist paradigm. More specifically, I use semi-structured interviews to investigate and grasp an understanding of the participants' attitudes and opinions towards a particular topic which will help answering the research question (Weber, 2004) so that I achieve maximum consistency possible between the research method and research question and produce valid and reliable data (Ritchie & Lewis, 2013). In order to achieve this successfully, I have carefully selected two participant groups and ensured that each participant fits the correct category that helped answer the research question.

This chapter thus describes the methodology, including the development of interview questions; the recruitment process for participants; the interviews, and following the interviews, how I used the audio recordings and created transcriptions that were returned to participants to amend any changes before data analysis occurred; and lastly, some ethical considerations around the interview process are discussed.

3.2 Research process

3.2.1 Research method: Semi-structured interviews

Qualitative methods are a way of discovering what individuals know, think and feel through interviewing and observing documents (Patton, 1990). Therefore, interviews have been chosen to unravel the attitudes of FT representatives and BCT experts. Additionally, the use of interviews provided the researcher with the opportunity to audio record and transcribe interviews for improved accuracy of data to be used for data analysis.

In order to achieve the research aim, semi-structured interviews were undertaken solely for the reason that they provide researchers with the opportunity to investigate and grasp an understanding of the participants' attitudes and opinions towards a particular topic (Weber, 2004). Furthermore, semi-structured provide interviewers with the chance to enquire openly about a specific topic, whereby the interviewer can then further discuss a range of ideas and build on participants' responses and understanding of the topic (Kallio et al., 2016). An understanding is also reached due to the interviewer giving prompts, leading participants to speak widely, on and around the topic area (Galvin, 2015).

Semi-structured interviews were used when interviewing participants as opposed to structured or unstructured interviews. The reason for this is because the use of structured interviews would have required all participants to be asked the same questions in the same order and do not allow for additional questions. Additionally, unstructured interviews were not used because this leads to the conversation going off-topic, with the responses becoming broken up, resulting in difficulty in generating findings (Doody & Noonan, 2013). Semi-structured interviews have been chosen because they help the interview remain reasonably structured by using the same questions, but allow flexibility within the way the questions are asked and in what order (Irvine et al., 2013). More so, they use an indicative guide to ensure the key questions remain consistent while still allowing a degree of freedom whereby participants are not confined by their answers, encouraging them to further elaborate on their answers and provide more in-depth responses.

Good practice was adopted when undertaking the interviews. This was achieved by adopting CHE, the principles of connectivity, humanness and empathy as a guide to conducting ethical semi-structured interviews. Connectivity was achieved by using video communications that allowed physical gestures to be seen, maintaining eye contact and smiling to show the researcher was engaged and open. Secondly, humanness was achieved by communicating

clearly with participants as well as recognizing both themselves as the researcher and the participant as givers and receiver of information. Lastly, empathy was an essential part of conducting the research. The researcher acted respectfully while receiving participants' responses and contributions without making any judgement. Additionally, the researcher used both verbal and non-verbal reactions through the use of open-ended questions, replying yes and uh-huh when the participant was speaking and head nodding to show their genuine level of interest (Brown & Danaher, 2019).

Interviews were conducted through video communications using Skype and Zoom. Of the 12 interviews, only one was conducted over skype with no camera due to technological difficulties. This is not believed to have impaired the research findings as the vast majority of interviews were able to be conducted with video communications using the camera. Video communication was chosen as opposed to face-to-face interviews due to logistical factors such as limited funding and geographical location with participants being located in numerous different regions around New Zealand and Australia. The inability to conduct interviews face-to-face is not believed to have impaired the research as Gray et al. (2020) stated that a recent comparison was made between face-to-face and online video interviewing and found that the quality of the findings from interviews did not differ between the two. This is an effective interview approach as it provides a physical presence that often increases the effectiveness of interviews through heightened rapport (Irvine et al., 2013). Through increased understanding between the interviewer and interviewee, this leads to less misunderstanding, making it easier to form trust between one another, often leading to more in-depth conversations (Polkinghorne, 1994). Therefore, helping the interviewer more effectively establish themes as respondents are more likely to provide detailed explanations once trust has been formed.

3.2.2 Development of interview questions

Below I provide the justification of how the literature led to the development of researchable questions, which I then have edited and selected include in my interviews.

Interview question one (IQ1):

IQ1 was developed as an introductory question to gather participants' level of knowledge on the opposing domain. Thus, FT participants were asked:

"*To what extent are you familiar with BCT?"* And

BCT experts were asked:

"To what extent are you familiar with the FT program?"

Depending on the response a participant gave, I provided them with information that would help them gain an understanding of the other domain. This way, the participants had an adequate amount of knowledge that would assist them in answering further interview questions.

Interview question two (IQ2):

IQ2 was established based on literature that states BCT is an efficient and effective technology that provides a transparent and traceable supply chain (Baralla et al., 2020) while having the ability to reduce the steps involved in the supply chain (Caro at el, 2018). As a result of this literature, I wanted to know what additional outcomes would present themselves as a result from FT implementing BCT. Participants were therefore asked:

"What outcomes would you anticipate as a result of BCT adoption into the FT program and into its certification process?"

If participants were struggling to respond to IQ2, a probing question was asked:

"*Apart from these, can you foresee any specific benefits BCT could bring to FT's goals?*

Interview question three (IQ3):

IQ3 was developed in relation to FT farmers' lack of power that may be the result from the extensive number of intermediaries in the supply chain (Omidvar & Giannakas, 2015; (Baumann et al., 2012). The researcher then wondered what the impact would be on middlemen if BCT was to provide information on all financial records along the supply chain. Therefore, participants were asked:

"*What impact on the middlemen do you foresee as a result of the implementation of BCT into the certification process of FT program along the supply chain?"*

Interview question four (IQ4):

IQ4 was formulated based on the literature that stated there is a wide range of barriers to implementing BCT including implementation costs, lack of knowledge, lack of advanced technology in developing countries (Sadhya & Sadhya, 2018), lack of trust and security issues (Balzarova & Cohen, 2020). Thus, would these barriers present themselves as a challenge for FT if they were to adopt BCT? Consequently, IQ4 was developed and participants were asked:

> *"What challenges/barriers do you foresee in relation to an adoption of BCT by FT, if any?"*

When the participants answered this question, they were further probed and asked:

> *"Why do you think so?"*

Interview question five (IQ5):

Lastly, I wanted to gain an overall understanding of the participants' perceptions and attitudes towards the adoption of BCT onto the FT program. Consequently, participants were asked:

> *"Based on your experience with FT, what is the likelihood that BCT would be adopted as a part of FT's certification program?"*

If participants responded positively, the researcher continued to ask:

> *"What kind of time horizon do you foresee for BCT's adoption?"*

If participants responded negatively, the asked:

> *"Why so?"*

3.2.3 Sampling criteria

When gathering data, it is important to collect data that represent a specific population as this increases the level of reliability around the data collected (Bartlett et al., 2001). A sampling criteria is essential in ensuring that appropriate participants are selected for the research. Relevant participants were either FT representatives or BCT experts. As there is no previous research on this chosen topic, the researcher's strategy was to focus on these two groups. Ethical approval has been obtained from the University of Canterbury to conduct this research and for ethical purposes participants' names were removed to provide complete confidentiality of responses that cannot be traced back to the participants.

3.2.3.1 FT representatives

Affiliation with FT Australia New Zealand was established via Google search and the FT Australia New Zealand website. FT representatives are defined as authorized individuals who conduct business on behalf of FT. Therefore, all of the representatives that are included in the research work for FT Australia New Zealand.

3.2.3.2 BCT experts

BCT experts were chosen as the second group of participants solely for their knowledge that would help in understanding how feasible it is for FT to implement BCT. Experts consisted of individuals both working in the industry and those who were academics in the field. Academics were chosen based on reading participants academic articles and their relevance in the area of BCT supply chains. As a result, the group consisted of four BCT academics, while the remaining two worked in the BCT industry. Despite the nature of the research question focusing on FT certification, BCT participants were not required to have any prior knowledge on FT in order to be able to help answer the research question.

3.2.4 Sample Recruitment

The recruitment of participants was achieved through selecting participants that fit the sampling criteria, and were representative of either chosen population. Recruitment was primarily achieved through LinkedIn, personal connections, using Google search to find participants contact details and reaching out via email, or alternatively previous participants placed the researcher in contact with their colleagues. When making initial contact with potential participants, I provided a cover letter (Appendix 4) that explained the research, followed by an explanation of the research process and what would be required of the participants if they were to take part in the research. If participants agreed to participate, prior to the interview they were provided with an information sheet (Appendix 5 and 6) that provided a more in-depth explanation of the research and the process, followed by a consent form (Appendix 7). The consent form acknowledges participants have read and understood the information sheet and consented to participate in the research.

The reason why six participants were interviewed from both groups was due to saturation of information being reached after 12 interviews (Guest et al., 2006). The participants included both female and male participants, and all of the participants had a variety of different jobs at FT whilst BCT experts were either identified as academics or working in the industry.

3.2.5 Conducting interviews

Semi-structured interviews were conducted in a reasonably flexible manner through the use of open-ended questions. This enabled the interviewer to reach clarification as they had the opportunity to explore new emerging questions (Mahat-Shamir et al., 2019). If at any point participants had expressed uncertainty about BCT or FT, I used my expertise to provide an explanation that would enhance their understanding of what the question was asking, further enabling them to respond to the questions. This allowed all FT representatives to have an understanding of BCT and in addition enabling all BCT experts to develop the same understanding of FT and their current areas of weakness.

I collected comparable data from participants to create a sense of understanding, through the use of the questions elaborated in Section 3.2.2, while also allowing new ideas to be introduced during the interview process based on what the interviewee has responded (DiCicco-Bloom & Crabtree, 2006). This aided in further discussions and helped with further understanding the attitudes of the participants. In order for the interview process to remain constant, interviews were undertaken over video chat. In order for these interviews to be most effective they were conducted over a 30 to 45 minute timeframe as this is how long it takes for saturation to be reached (DiCicco-Bloom & Crabtree, 2006). Saturation is the point where no new information is being obtained from the interviews as the researcher has undertaken a deep exploration of the questions and is not receiving any new data (Guest et al., 2006).

3.2.6 Recording of interviews

When conducting in-depth interviews, Seidman. (2006) states that there is no doubt that interviews should be recorded. Recording of interviews is said to improve the accuracy of information collected, resulting in rich data. More so, recordings provide interviewers with the opportunity to listen to the recording as many times as necessary in case of any doubt they may have about participants' responses (Al-Yateem, 2012). Therefore, all twelve interviews were audio recorded for this purpose. The interviews were audio recorded using the interviewer's personal phone through the voice recording app to achieve high-quality recordings. It was essential that the recordings were of a high standard as they were needed for transcriptions. Once the interviews were completed, the recordings were then kept on the researcher's personal password-protected computer to ensure confidentiality of information.

3.2.7 Transcribing of interviews

Transcribing of audio recordings was a crucial step in the research process. Transcribed interviews were returned to participants which provided them with the opportunity to verify, amend and remove any responses they did not wish to include in the study. Each participant was given 14 days to amend any changes to the transcript and return their approved copy that would then be used for data analysis. Of the twelve participants, ten returned transcripts with no amendments, while the remaining two had made amendments by elaborating on previous responses they had made during their interview.

Transcriptions provided the researcher with clear written data that could be analysed. Thanks to including the transcribing process, the researcher was able to focus purely on the conversation and did not have to face concerns about note-taking at the same time, therefore were able to be more engaged in the conversation (Seidman, 2006). The researcher was responsible for transcribing five interviews, while a transcriber was hired for the additional seven interviews. The transcriber's confidentiality consent form can be found in Appendix 7.

The data were then analysed through NVivo, a qualitative data analysis software that provided the appropriate tools to code the data under nodes and sub-nodes before identifying themes and interpreting and analysing the data.

3.3 Ethical considerations

Ethical considerations play a major role in the research process as the researcher needs to be considerate of any ethical issues that have the potential to surround their research. In order to ensure ethical considerations were abided by, a low-risk Human Ethics Application was filled in and sent to the University of Canterbury Human Ethics committee, which was accepted prior to the research process being undertaken. Confirmation of this can be found in Appendix 8. A low-risk application was met due to the study purely investigating participants' attitudes, no personal data are being collected, the researcher is not providing inducements or incentives to participate in the study and data are collected via video chat to ensure safety of the researcher. The application placed a major focus on how participants would be treated, consent for audio recordings and use of information, while also highlighting all responses would be confidential with all participants' names being excluded from the study.

Additionally, through the information sheet (Appendix 4 & 5) and consent form (Appendix 6) participants were informed of the research project and what participation was

required of them, followed by their rights and how they can remove themselves and their responses from the study. The consent forms were signed and returned to me before any data were collected to ensure participants approved of the process.

CHAPTER FOUR – DATA ANALYSIS

4.1 Introduction

Following the interviews, I used thematic content analysis to identify and draw out participants attitudes. Following on from this, transcripts were read and measured against the Technology Readiness Index (TRI) to establish their readiness to adopt BCT. The analysis will therefore help to answer the proposed research question and interview questions as the process involves generating codes, categorizing and exploring textual data to determine trends and themes (Vaismoradi et al., 2013).

4.2 Thematic analysis

Thematic analysis provides a systematic approach with which to analyse data in a way that the participants may have interpreted it and what they believe to be the underlying themes (Vaismoradi et al., 2013). I adopt six step process according to Vaismoradi et al. (2013):

4.2.1 Familiarisation

I familiarised myself with the data by immersing in order to make sense of individual data transcripts as well as grasping an understanding of the dataset as a whole (Braun et al., 2019). This is a critical step which enabled a continuous reading over the transcripts until they a complete understanding of the data was obtained.

4.2.2 Generating codes

The next step of the process involved generating codes for the data through NVivo 11, a qualitative data analysis software (QDAS). Despite NVivo being a data analysis software it does not identify the themes and concepts from data entered into the software as it is essentially a software for managing concepts. Therefore, NVivo makes no analytical contributions to the research and it is purely up to the researcher to interpret and categorise the data (Woolf & Silver, 2017). NVivo is simply used to support the researcher in providing the appropriate tools to assist in data analysis. As the interviews were conducted in a semi-structured manner the questions were not asked in an orderly fashion, therefore, NVivo was used to group the participants' responses under nodes. This was achieved by importing the transcripts into NVivo where I read through one interview at a time, beginning with FT representatives' interviews before moving onto BCT experts' interviews. Whilst reading through the interviews, highlighted excerpts of participants' responses distinguished between created nodes and sub-nodes. The nodes and sub-nodes were representative of similar responses that appeared between the different participants. Therefore, this helped grouping together comparable responses, which was achieved by formulating

rules that each excerpt had to meet in order for it to be categories under a specific node of sub-node. Initially, 39 nodes were constructed, although after further examination the data was condensed into 33 nodes along with their rules that can be identified in Table 4.1 below to help clarify the scope and meaning of the data.

Table 4.1: List of rules and nodes/sub-nodes

Nodes/Sub-nodes:	**Rules:**
Inequality in bargaining power	Expressing that there was inequality of bargaining power between players in the supply chain.
Disruptive technology	Believed that BCT was going to disrupt the current way FT certification operates.
Concerns about information validity	Worried about false information being entered into the blockchain whether this be human error or a vested interest. Sharing concerns over how information would be verified that was entered into the blockchain. Concerns surrounding incorrect info sharing.
Potential to reduce the number of middlemen	Participants mentioned peer to peer transactions as a mean to reduce the number of middlemen. Perception that BCT has the potential to cut out middlemen.
Resistance towards FT's improvements as a result of BCT	Respondents do not see a link of improved FT certification programme as a result of recording transactions and products' credentials onto BCT platform. Respondents declared reservations towards benefits of BCT in respect to FT programme.
Caution around information sharing	Indicated concern about the repercussions that came with increased information sharing. Transparency will reveal more than necessary. Participants who suggested that implementing BCT would alter intermediaries' behaviour. Participants who had indicated that increased information sharing was unnecessary. Data entered under BCT but still concerns about its accuracy and validity.

Consumers demanding increased transparency	Consumers are demanding increased transparency in the supply chain.
Cost as a barrier to implementing BCT	Responses showed concerns associated with the cost of BCT concerns over who should cover the increased costs.
Difficulty in increased transparency	Indicated that it would be a struggle to get all intermediaries along the supply chain to become more transparent and increase information sharing. Increased transparency will come with hardship.
Consumers increased awareness of their purchasing impact	Consumer will see the impact on farmers' wellbeing as a result of purchasing a FT-BCT enabled product.
Farmers lack resources, time and money	Shared concern for FT farmers not having the necessary resources, time or money to undertake the steps required to implement BCT. Reduced middlemen increase farmers work load which they do not have the time for.
Consumers lack of interest in fine details	Participants who had specified that consumers are not demanding increased transparency. Concerns over consumer information overload.
Improved efficiency	Perception that if FT certification implements BCT, it will provide improved efficiency along the supply chain.
Information is power	Possessing more detailed information will lead to increased (however by respondents not specified) future benefits. Participants who believe that increasing information transparency will prove to be beneficial.
Increasing farmers negotiation power	Confidence that farmers have the appropriate resources to be able to increase transparency at their end of the supply chain.
Negative attitude towards BCT	Participants who opposed implementing BCT as a part of FT certification.
Positive attitude towards BCT	Expressed a positive view towards FT implementing BCT. Sees possible benefits for FT from related used cases, for example in humanitarian logistics and disaster management.

Resistance towards information sharing	Expressing resistance towards disclosing information along the supply chain.
Uncertainty about impact on middlemen	Respond with doubt about the impact that BCT would have on middlemen involved in the supply chain. Questioned whether it was possible for BCT to cut out middlemen from the supply chain. Mentions a number of conditions necessary for disintermediation to happen.
Unfamiliar with BCT/FT	Had a lack of understanding about BCT/FT. Expressed that there was a lack of familiarity with BCT/FT.
Familiar with BCT/FT	Were confident in their understanding of BCT/FT.
Reasonably familiar with BCT/FT	Has a moderate understanding of BCT/FT.
Lack of understanding on what BCT represents	Expressed that a barrier to implementing BCT was due to a lack of knowledge and need to learn.
Transparency will not increase	Transparency will not be shared on public ledger and actors in the supply chain will be operating on the private ledger on BC. Consumers will not see all data related to production.
Innovative technology learning curve	BCT will follow the same patterns for adoption as previously innovations and technologies followed.
Increased clarity	BCT seen as a platform for enhanced visibility of products attributes in the supply chain.
Conditional benefits	A number of conditions need to be addressed for the benefit to happen. The way FT operate is determined by the supply chain they are utilising.
BCT can help verify FT	BCT provides the opportunity to validate information shared onto the blockchain.
Behavioural changes dependant on the supply chain	Intermediaries will alter their attitude or way they conduct business as a result of utilising transparent or non-transparent supply chain.

Increased transparency and traceability	Increases transparency and traceability. Addresses food fraud. Addresses forged labels. Shows who adds value and where. Foresee benefits for FT as a result of BCT increasing transparency along the full extent of the supply chain. Participants mentioned information asymmetry, increased transparency or reduced costs.
Integrating BCT with regulations	BCT will need to align their processes with legal requirements.
BCT is only good as the information shared	Information included onto the blockchain depends how informative it will be.
FT lacks traceability	FT do not have transparency down to the farmer level.

4.2.3 Constructing themes

Qualitative data analysis uses a combination of two processes in order to identify emerging themes from the data. Initially the researcher reads the transcribed interviews. The continuous process of re-reading transcripts helps further the understanding of the data and themes that emerging from them. Furthermore, it also helps to discover unexpected themes that may have been missed during the first analysis round. Therefore, this ensured a sound analysis was achieved and no themes were missed. More specifically, themes were identified by looking at the 33 nodes specified (cf, Table 4.1). This gave the researcher a clear visual of the responses made by participants and helped to group the nodes together and identify the overarching themes that appeared from the data. As seen in Table 4.2, the researcher discovered five main themes that appeared from the data, while the sixth theme was representative of the participants' familiarity of BCT. Once the themes had been grouped, they were then given names that captured the overall meaning of the data (Braun et al., 2019). These themes established the base to analyse the data and present the discussion in Chapter Six.

4.2.4 Revising and defining themes

Themes were then reviewed and re-read as the overall data that tells the story would be weakened if themes were not clearly defined (Braun et al., 2019). This was an important step as it helped to distinctly characterise each theme and ensure that nothing had been missed or was overlapping with another theme (Braun et al., 2019). After revising the themes and they were reviewed against the data set in order to see how the themes fit together. This was achieved using a thematic map to visualise the data and look at how it would tell an overall story. Through this process it enable the researcher to comprehend a deeper understanding of each theme and the underlying meaning of the data.

4.2.5 Naming themes

Once the themes were defined, I then moved on to establish the names in a way that clearly defined the scope of the data. Theme names were kept short in order to signal the essence and easy interpretation. The themes are shown in Table 4.2 and defined as: 1) Conditional benefits; 2) Transparency (positive); 3) Transparency (negative); 4) Barriers; 5) Consumer behaviour; and 6) Level of familiarity.

Table 4.2: Themes that appeared in the data

Themes	**Nodes that categorised the theme**
Conditional benefits	- Behavioural changes dependant on the SC - Increasing farmers negotiation power - Innovation technology learning curve - Integrating BCT with regulations - Information is power - Disruptive technology - BCT is only as good as the information shared
Transparency positive	- Increased clarity - Improved efficiency - BCT can help verify FT - Increased transparency and traceability - Positive attitude towards BCT - Potential to reduce the number of middlemen
Transparency negative	- FT lacks traceability - Negative attitude towards BCT - Transparency will not increase - Uncertainty about the impact on middlemen - Difficulty in increased transparency - Concerns about information validity - Caution around information sharing - Resistance towards FT's improvements as a result of BCT - Inequality in bargaining power
Consumer behaviour	- Consumers lack of interest in the fine details - Consumers increased impact on farmer's livelihood - Consumers demanding increased transparency

Barriers and challenges	- Lack of understanding on what BCT represents - Cost as a barrier to implementing BCT - Farmers lack resources, time and money - Resistance towards information sharing
Level of familiarity	- Reasonably familiar with BCT/FT - Unfamiliar with BCT/FT - Familiar with BCT/FT

4.2.6 Producing the findings

Once the data have been revised and defined, I can report the findings. Along with reporting the findings, I incorporate literature to offer a deeper insight for the reader. These findings are reported in Chapter 5. In addition, I interpreted and analysed the themes in order to present a comprehensive discussion in Chapter 6. The discussion captures the meaning of the data and the ideas "beneath the surface" in combination with the more explicit meaning of the data (Braun et al., 2019).

As a second aspect of data analysis, data were measured against the TRI categories to grasp an understanding of participants' readiness to adopt BCT onto FT's program. Thus, I analysed all interviews, one at a time, counting the number of comments that participants expressed towards optimism, innovativeness, discomfort and insecurity. As the categories are rather distinct, this meant participants could possess contrasting views and have both positive and negative views towards the adoption of BCT.

CHAPTER FIVE - FINGINGS

5.1 Introduction

The findings in this chapter are split into seven sections. Each section delivers findings related to one interview question. This ensures that the reader can clearly distinguish participants' attitudes towards a number of different themes as well as comparing the differences in responses between FT representatives and BCT experts. The five different sections will cover:

1)Familiarity of the opposing domain;

2)Anticipated outcomes of FT and BCT's merge;

3)The impact BCT would represent for the middlemen in the supply chain;

4)Barriers and challenges foreseen as a result of implementing BCT; and

5)Benefits to FT as a result of adopting BCT.

The findings allowed the researcher to develop an understanding of FT representatives' and BCT experts' attitudes towards BCT as a potential to improve the outcomes of Fairtrade's certification. Of the twelve participants who were interviewed, Participant four stated from the outset to not be able to answer the interview questions for lack of adequate knowledge about BCT. I then offered to explain and clarify the nature of BCT, but the participant refused this offer and the interview was terminated.

This study links two different fields of expertise together. One encompasses knowledge and experiences related to the FT program and its certification process, the other is embedded in BCT expertise. The researcher observed a degree of unfamiliarity in the overlapping area of the two fields, as shown in Figure 5.1. The 'lack of understanding' became apparent through answers and comments respondents provided.

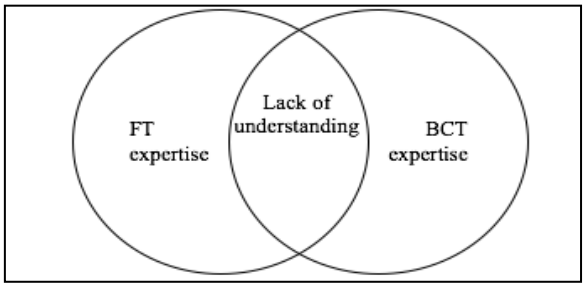

Figure 5.1: Intersection between domains of expertise

Whenever I noticed incorrect assumptions during the interview, I critically enquired with the participant, and if possible, clarified the misunderstanding straight away. It is possible that my lack of technical and programming knowledge relating to BCT may have created foundation for incorrect assumptions especially for interviews carried out with FT's representatives discussing BCT. Therefore, I acknowledge this limitation in my research and the possibility that some views may have not accurately captured the realities of this overlap. Still, every effort was exerted to minimise the lack of understanding depicted by the overlap in Figure 5.1 as much as possible. On the other hand, this study represents perceptions of what the two groups of respondents hold about the topic and while there clearly is a lack of understanding in the overlap of the two disciplines, I am confident that the following sections of findings capture the observed phenomenon truthfully.

5.2 Familiarity of the opposing domain

As an introductory question into the interview I asked participants to what extent they were familiar with BCT or the FT program in order to gain an understanding of their level of familiarity with the field not related to their expertise. The participants self-assessed their familiarity across three categories: familiar; reasonably familiar and unfamiliar.

As depicted by Figure 5.2, five of the FT's respondents reported unfamiliarity with BCT. The researcher briefed the participants on BCT before the interview progressed further. Similarly, if BCT experts could not fully understand the FT program, they were provided with additional information about FT organisation, its goals and FT's certification process. On the other hand, familiarity was reported through BCT experts (familiar) and one FT representative acknowledging they were reasonably familiar with BCT.

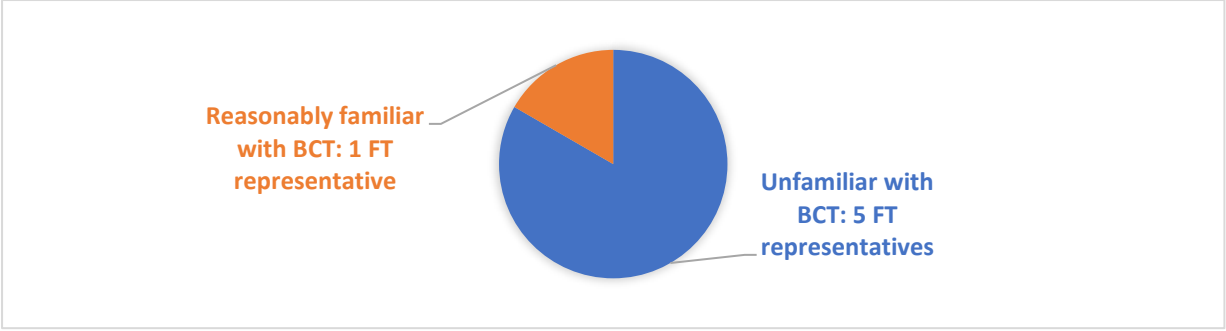

Figure 5.2: FT participants' self-assessed familiarity of BCT

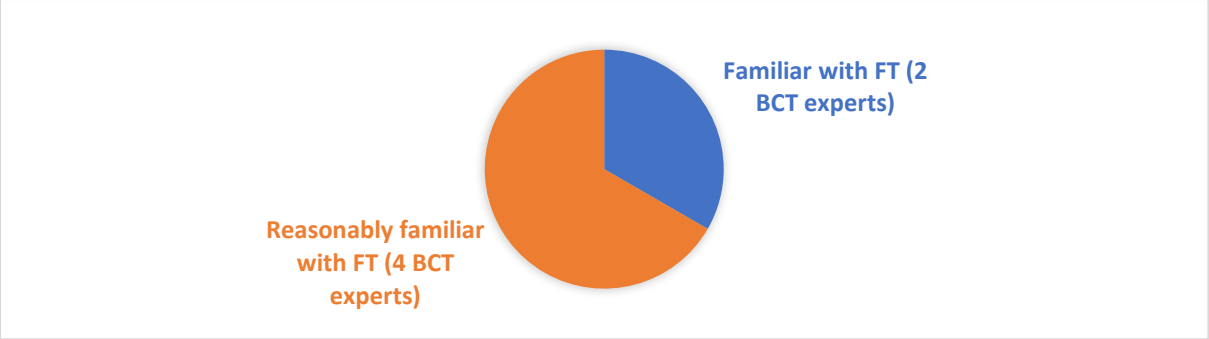

Figure 5.3: BCT experts self-assessed familiarity of FT program

Overall, there has been an observable degree of perceived unfamiliarity about BCT amongst FT respondents. One FT representative was aware of the technology and has been involved in decision making process over the technology's strategic implementation into the FT program. One FT representative declared absolute unfamiliarity with BCT and wished to terminate the interview. All other participants, once briefed were happy to continue to answer the remaining interview questions.

Reporting degree of familiarity for BCT respondents over FT program was not really an issue as most BCT experts have already been purchasing FT certified products and in general understood what the FT program strives to achieve. Examples below provide insights into the narratives related to the FT representatives' degree of familiarity with BCT.

"No, I'm not familiar with blockchain technology"

(Participant five)

"I'm not very familiar, I've heard about it, but I definitely do not know a lot about it"

(Participant six)

"I'm moderately familiar with it"

(Participant three)

These responses coincide with the researcher's findings, as to the best of their knowledge FT have not yet implemented BCT. This was confirmed as Participant five who shared the statement made by Flocert two years ago. Flocert had researched BCT and found that it did not meet their business needs, although they will keep an open mind. As for BCT experts, they demonstrated advanced awareness when compared to FT representatives which is understandable given the background of their profession.

Examples of BCT experts' responses in respect to the familiarity with the FT program are provided below.

"We have a really good handle of the space in general"

(Participant seven)

"Yes, very familiar with the idea of Fairtrade and how it all works"

(Participant twelve)

5.3 Anticipated outcomes of FT and BCT's merge

With the overlap the two disciplines face, the respondents were asked "*What outcomes would you anticipate as a result of BCT adoption into FT program and into its certification process?"* Figure 5.4 and 5.5 depict the respondents' answers with respect to this question.

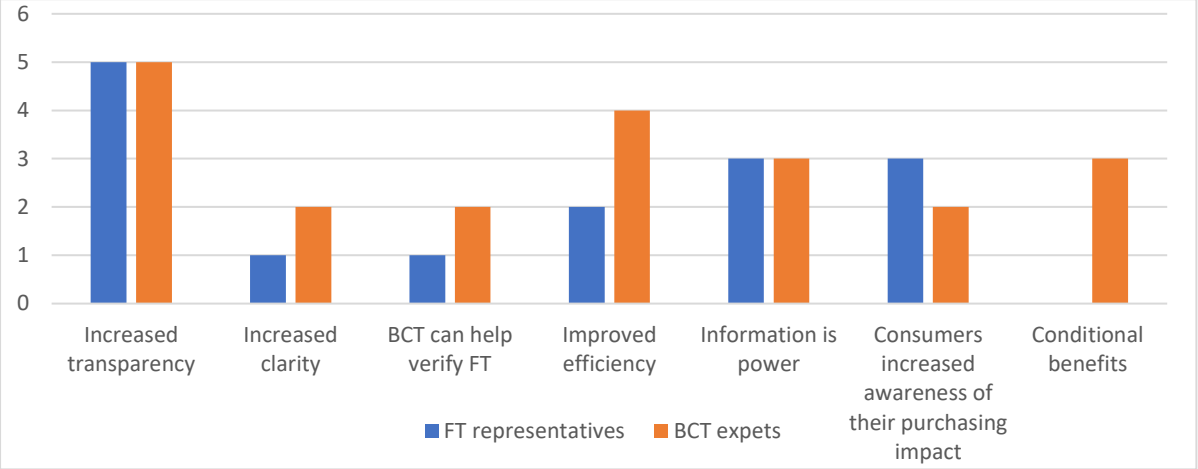

Figure *5.4: Identified positive outcomes as a result of FT/BCT adoption*

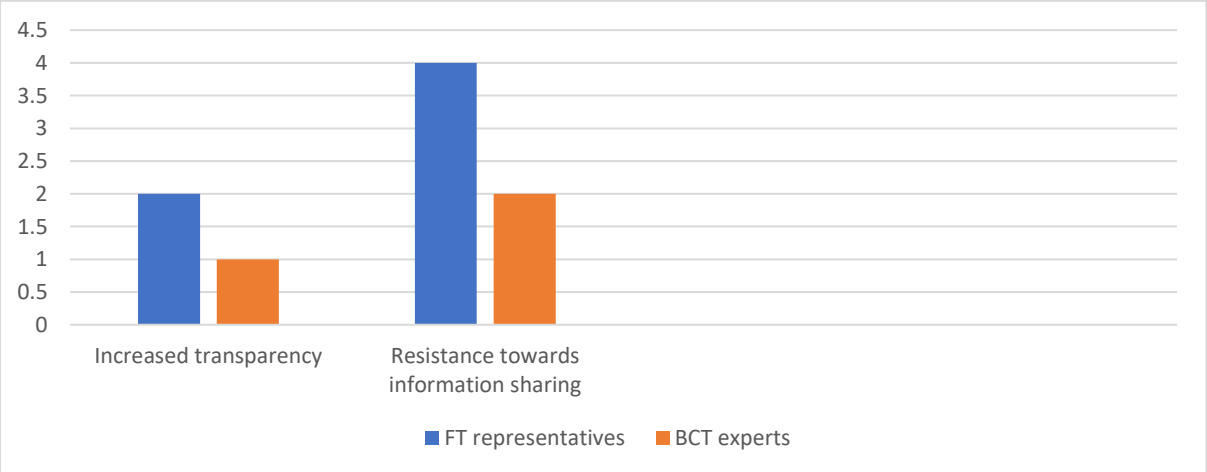

Figure 5.5: Identified negative outcomes as a result of FT/BCT adoption

Overall the outcomes can be categorised into positive and negative outcomes. Positive outcomes encompass issues related to desired benefits. In this sense, seven main outcomes were identified. The respondents foresaw increased transparency, improved efficiency of FT's supply chains, increased clarity about goods credentials, information as power, enhanced consumer awareness of their purchasing impact, BCT can help verify FT and conditional benefits. On the other hand, two negative outcomes were identified too; increased transparency and resistance towards information sharing. These can be viewed as undesired consequence resulting from potential BCT adoption into FT certification process. Note that these positive and negative perceptions will later be counted to derive the TRI. I now discuss the individual outcomes in turn.

5.3.1 Positive outcomes

5.3.1.1 Increased transparency

The most commonly perceived benefit that participants (5 FT and 5 BCT respondents) foresaw was increased transparency. All participants commented on that increased transparency would address issues related to food fraud and possibly indicate how individual added value is financially recognised along the supply chain. Amongst these statements, participants more specifically declared:

> *"The main benefit is increasing the transparency."*
>
> (Participant eleven)

> *"I think exposing margins will be really beneficial for those who are getting the lowest margins."*
>
> (Participant one)

These responses represent the overall attitudes of all participants who foresee that increased transparency will benefit FT certification. Although three FT representatives held a negative view towards BCT in general, they still held the view that increased transparency would be beneficial for FT as one participant stated that FT always need more transparency an blockchain can provide that for them. Participants have expressed their position in the following ways. For example:

"I think any information that we can get would be able to be transparently shared through to a consumer is beneficial"

(Participant three)

"The main benefit is increasing the transparency between the farmers and their customers. For me as a final customer, I am more encouraged to consume a product that is made by a fairly paid labour force."

(Participant eleven)

Increased transparency allows consumers to see that they are purchasing a product from farmers who were paid a fairer wage. There are already initiatives that disclose proportions paid to the original farmer through the FT program in Norway. The supply chain transparently shows that through the distribution of profits along the supply chain (cf, Figure 2.2), farmers earn 13.1% of the profits (Naegele, 2020).

Participants' responses are in line with the literature that states BCT increases transparency and traceability. Figorilli et al., (2018) state that the full extent of the supply chain can be tracked all the way from producer to consumer as links are established between middlemen showing the process that goods undertake along the supply chain.

"BCT gives a platform for all the intermediaries to view their data and transactions, instead of storing those in a centralized location."

(Participant ten)

5.3.1.2 Increased clarity

As a result of increased transparency, increased clarity was perceived by one FT representative and two BCT experts as beneficial for FT. All three respondents perceived that improved clarity meant improved visibility of product attributes. Such information is perceived as relevant to any actor within the supply chain but particularly to the farmer or a consumer who wishes to learn more about the conditions under which the product was produced. The two examples below illustrate this point.

"I think the more knowledge that producers and farmers have about what happens to their product and who is making what in the supply chain is good for them"

(Participant one)

"QR codes enable consumers to scan the code with their smartphone and see where and under what condition their coffee was purchased from."

(Participant twelve)

This point raised by participant twelve relates to the literature by Violino et al. (2019) who explained that QR codes enhance clarity of information and specifications about produced goods. Ideally, if this information was accompanied with price for which goods were sold by the producers and the price consumer paid in the end, such information could possibly shed light onto inequalities related to the financial rewards relative to the added value by various actors throughout the supply chain.

"I think the more knowledge that producers and farmers have about what happens to their product and who is making what in the supply chain is good for them."

(Participant one)

5.3.1.3 BCT can help verify FT

Another benefit that was perceived by participants is that BCT can reduce bureaucracies via managing documents and using the technology to validate the information shared onto the blockchain. Participant seven comments:

"Instead of me having a copy of my database and sharing that to you and then your system interpreting and ingesting that and everyone ends up having different copies of the same information recorded and stored in a different way that becomes hard."

(Participant seven)

Additionally, one FT participant and two BCT foresee benefits of everyone having access to the same copy of the same database without having to rely on a third party to run the system for them. Such preconditions would open up the door for improving those processes and would not only increased clarity but further improved efficiency. More specifically, participants explained:

"I think BCT's contribution to FT might be is essentially enforcing it because right now the current supply chain systems really can't guarantee that FT is being enforced"

(Participant eight)

"Through blockchain it kind of cuts down the ability of transnationals to detect Fairtrade coffee which potentially may not be Fairtrade coffee."

(Participant three)

Participants perceived that total disclosure of information would enable FT certification to verify their certification. More specifically the responses from respondents included statements such as:

"If there was a traceable, immutable compliant blockchain that certifies these things all you need is the QR code and your phone and these labels can be proven."

(Participant nine)

"There is a lot of enforcement that blockchain enforces through transparency so you can't swap out with non-FT product. There is a lot of expense and a lot of effort that has gone into guaranteeing this."

(Participant eight)

This benefit was perceived by one FT representative and two BCT experts, who viewed that through BCT-FT interface could be provided with the opportunity to verify their certification when data is entered onto the blockchain. This was thought to be the case due to participants perceiving that there is no need to doubt the data and it really will be FT not a bogus claim.

5.3.1.4 Improved efficiency

Five participants (two FT and four BCT respondents) anticipated improved efficiency along a FT supply chain. All five participants acknowledged the ever-present intent to improve efficiency within the supply chain. The literature states that operational efficiency is achieved in two ways; cost-based efficiency and operational efficiency (Hasan et al., 2020). Operational efficiency is achieved through transactional trust, reduced number of middlemen, limited settlement times and digitalized documents. Whilst cost-based efficiency is achieved through time-based efficiency, smart contracts, distribution speed and turnover rates (Hasan et al., 2020). Below are two illustrative examples related to improved efficiency resulting from BCT.

"It will make chains very efficient"

(Participant eight)

"We think that overtime there is enough efficiency in the system that overtime it (blockchain) will become the rails of the financial world"

(Participant seven)

Participant number seven further elaborated that if the world's monetary system would run on BCT then naturally trade would follow the same route. The participant did not believe that there was a choice whether the technology will be adopted of not. The participant basically foresaw that this was where the technology is heading. These findings are consistent with Hasan et al. (2020) who have recently reported that there is potential for organisations to achieve operational efficiency as a result of bringing BCT into effect.

5.3.1.5 Information is power

Three FT participants and three BCT experts all had an agreement on the same idea that possessing more detailed information will lead to increased future benefits. Such benefits would be a result of increased transparency and was explained by a FT representative as *"Really quite powerful."* They further went on to state:

"Knowledge is power, and I think the more knowledge that producers and farmers have about what happens to their product and who is making what in the supply chain is good for them, it gives them more negotiating power to hang on."

(Participant one)

This idea was also agreed upon by a BCT expert who commented:

"Information in this sense is giving middlemen the power to make decisions about how they want to play in that supply chain. At the moment they don't have information so they can't make choices"

(Participant seven)

The findings reinforce the literature by Chau et al. (2016) who state middlemen are acquiring unfair profits due to their market power. These profits tend to be acquired by those middlemen who are higher up the supply chain as this is where there is greater power. As mentioned by participant seven farmers do not have the necessary information to help them make informed decisions that will better their future. Although through the implementation of BCT there is

potential for this to change as implementing BCT will increase transparency and meaning more information would become available to farmers, in return providing farmers with greater opportunities to make choices based on increased information sharing. Overall, providing future benefits for farmers that would not only be able to help them but also their families and wider community

5.3.1.6 Consumers increased awareness of their purchasing impact

Five respondents (three FT and two BCT participants) linked enhanced visibility throughout the supply chain as an opportunity to assist consumers to see the impact they have on farmers wellbeing as a result of purchasing FT-BCT enabled products. Below are examples of participants' responses:

> *"There are a lot of people who mean well and they want to help other people and they feel like well I can't go directly to that farmer in Columbia and help them out but maybe I can do my part by just buying stuff that's produced and labelled FT. And you know that's better than nothing so if they can do that."*
>
> (Participant eight)

As participant eight discussed there are a number of consumers who want to do good and help those in third world countries by purchasing FT products. Therefore, if through the implementation of BCT FT are able to transparently show consumers the full extent of their supply chain this is perceived to be beneficial. Furthermore, with advancements of technology via IoT, 5G, big data and the development of QR, RFID codes, consumers should gain deeper insights into what conditions the purchased product was created. As (Kohler & Pizzol, 2020) confirm, this is becoming increasingly important for many consumers to see where their purchases are coming from. BCT would assist consumers to see directly whom, how and where they are helping farmers.

> *"QR codes enable consumers to scan the code with their smartphone and see where their coffee was purchased from and how much money is going back to the farmer"*
>
> (Participant twelve)

> *"It's a really cool way of empowering the consumer to just understand what the benefit is of purchasing."*
>
> (Participant three)

"We want to increase connectivity between producers and consumer, which is what BCT promises"

(Participant two)

Additional statements concluded that the benefits would not only extend to the consumers, they would also benefit FT certification as through increasing transparency FT see that this would help show their consumers the difference they are making to the lives of farmers. This is evident in the responded made by a FT representative who stated:

"Consumers will be able to see the extent to which their purchases are impacting farmers and how it is improving their quality of life, as the more FT products purchased the more money that will go back to the farmers."

(Participant twelve)

"I guess having something so traceable and transparent will really show our customers how much of a difference we are making to the lives of farmers."

(Participant six)

Therefore, participants foresee that presenting to consumers the impact they are having on farmers' livelihoods would not only meet their demands for increased transparency it would also expose FT and help show the extent to which they are helping farmers and their wider community. Additionally, with the desire to increase the connection between farmers and consumers this would meet the needs of consumers significantly as a study in 2016 found that 94% of consumers find transparency important and additionally want to see how their food is produced (Köhler & Pizzol, 2020). Consumers not only wish to know how they may improve farmers' livelihood but also certainty that purchase they made are embedded in verified environmentally and socially sound practices.

5.3.1.7 Conditional benefits

Three participants all being BCT experts mentioned a number of anticipated direct benefits for FT. There appeared to be a common thread amongst participants foreseeing a number of conditions that need to be addressed for example with respect of the outcome related to the reduction of the number of middlemen. Overall, the conditional benefits were tied up to a process or an infrastructure necessary to establish before BCT would be adopted by FT. The

issue of training on how to use the technology by all actors with particular focus onto the actors at the bottom of the supply chain.

> *"I think a good way to be able to prepare those people to know more about technology, not only BCT but all technologies so they can increase the transparency of all information and make them closer to the final customers of their products if you are able to give them the amount of education required to do so it's much better than just giving blockchain when they don't have enough education to use it."*
>
> (Participant eleven)

Comments related to a need to establish necessary infrastructure before BCT adoption. Participants viewed both the bottom of the supply chain as a priority while acknowledging need for creation of necessary regulations and government policies for the system to operate. Regulatory requirements shall address issues related with smart and consider the implication with respect the integration of AI, IoT, big data and other technologies. Below are examples of narratives conveying such messages.

> *"As I said they need to work more on creating the infrastructure required for establishing BC at the bottom of the supply chain where the low paid labourers are working."*
>
> (Participant eleven)

> *"So apart from the technical side of things there are other issues that need to be addressed or looked at, from a policy and socio-economic perspective, prior to reducing those intermediaries in the BC supply chain."*
>
> (Participant eleven)

In case where participants considered the outcome of reduced number of middlemen as a benefit, additional implication were highlighted.

> *"BCT can reduce the number of intermediaries, but there needs to be some organisation, or a consortium of organisations which are involved in the network"*
>
> (Participant ten)

"But from a BC perspective it would require greater collaboration between different technologies and different organisations to be able to fully achieve its objectives… if BC is integrated with AI, so, if using BC, AI and smart contracts, you are able reduce the dependency on manual tasks or manual interventions. Then to some extent intermediaries are reduced. Those are the areas where you can talk about disintermediation or reducing the number of hands that are changing the goods in the supply chain."

(Participant ten)

The responses from participants identify seven positive outcomes that would result from implementing BCT onto the FT program. These outcomes would bring benefits to the certification program and help improve the program in a number of ways.

5.3.2 Negative outcomes

Despite identifying a plethora of beneficial outcomes, participants mentioned two potential negative outcomes related to FT-BCT enabled processes. These could be categorised into the following groups: Increased transparency and resistance towards information sharing.

5.3.2.1 Increased transparency

Both groups foresaw the different flavours of increased transparency while using an analogy of a "double edged sword". In this sense, the most flashbacks were related to the provision of too much information exposing the actors, including FT processes for possible unwanted attacks from NGOs, consumers or competition. Half of the respondents expressed concerned over consumers' lack of understanding of margins along the supply chain and the complexities value chain represents.

"I'm convinced that the public don't really understand the margins and I think most of them would be kind of horrified to see what retail mark ups are. I think it'll be a can of worms when it first comes out"

(Participant one)

In voicing their opinion, participant one further went on to state that FT could be heavily penalized for exposing what margins are and what the commercial margins are in the world which could result in Fairtrade getting knocked back. This is in line with a response made from a BCT expert who commented:

"People don't want to be too transparent because sometimes it reveals too much."

(Participant nine)

5.4.8.2 Resistance towards information sharing

Participants do not see a link of improved FT certification as a result of recording transactions and products credentials onto the blockchain platform as a result of the consequences that can come with increased transparency. So, although there are positive consequences that result from increased transparency there is also resistance coming from participants to increased information sharing. Participants mentioned:

"Disclosing all the information seems rather unnecessary. Consumers may think that the farmers are not receiving a fair enough wage but in their country it may be a sufficient wage they are receiving, so there could be a lot of confusion around that."

(Participant six)

Participant six further went on to explain that disclosing all of this information, could lead consumers to question what is happening along the supply chain regarding margins and why there is such an uneven distribution of income along the supply chain. A similar response was also brought to the researcher's attention by a BCT expert who responded:

"I think the main threat would be for employers because they are employing labourers with slave wages and they are exploiting them so it might be threatening for workers because employers do not like to display this type of information to others."

(Participant eleven)

As mentioned by two responders employers are resistance to display this kind of information because of how it may harm them and consequently FT certification. De Cremer (2016) comments on this idea, stating that transparency may encourage individuals to cheat the system and as BCT allows for this behaviour it is possible that information entered onto the blockchain may not be correct as BCT is simply for storing data (Figorillo et al., 2018) and does not audit the data that is entered onto the blockchain. BCT experts have spoken on this issue, stating:

"There are scenarios where that data can actually be tampered, or incorrect data is entered and that is the point where transparency gets compromised"

(Participant ten)

"You could get to a problem where it's like look at all this cool Fairtrade data it's on a blockchain it's immutable but actually the data has been put in by people who have a vested interest"

(Participant seven)

With respect to fully disclosing information along the supply chain, respondents indicated concern about the repercussions that came with increased transparency as it will reveal more than what is necessary to the public eye. Both FT representatives and BCT experts expressed their concerns commenting:

"Sharing this information at each stage of the supply chain is really interesting but really confidential information for everybody. So, it becomes a challenge when people have to share their data and how do we protect data?"

(Participant five)

"If you implement the data schemes really well you can be selective about the types of data that are high risk that will cause adverse responses and publish the data that's essential to causing positive responses."

(Participant seven)

These responses emphasise that middlemen need to be cautious when increasing information as mentioned by participant one FT could be heavily penalized for sharing all of this information and exposing margins, resulting in a detrimental impact on middlemen. Hence why participant seven discussed the need to be selective about the type of information that is shared or the impact on middlemen could be increasingly negative. BCT allows middlemen to be selective about the information they enter as it is purely for storing centralised data, therefore, this means that blockchain is only as good as the information shared.

Whether incorrect data entry is from human error or a vested interest the pressure to increase transparency and fully disclose all information along the supply chain has been identified by

participants as harmful for FT's certification. Purely for the reason that if FT were to be caught with incorrect information entered into the blockchain this could be harmful to FT's verification processes leaving consumers questioning their authenticity.

5.4 The impact BCT would represent for middlemen in the supply chain

When faced with question *"What impact on the middlemen do you foresee as a result of the implementation of blockchain technology into the certification process of FT program along the supply chain?"* participants responded in a number of ways. The answers are depicted with respect to the respondents' discipline affiliations in Figure 5.6.

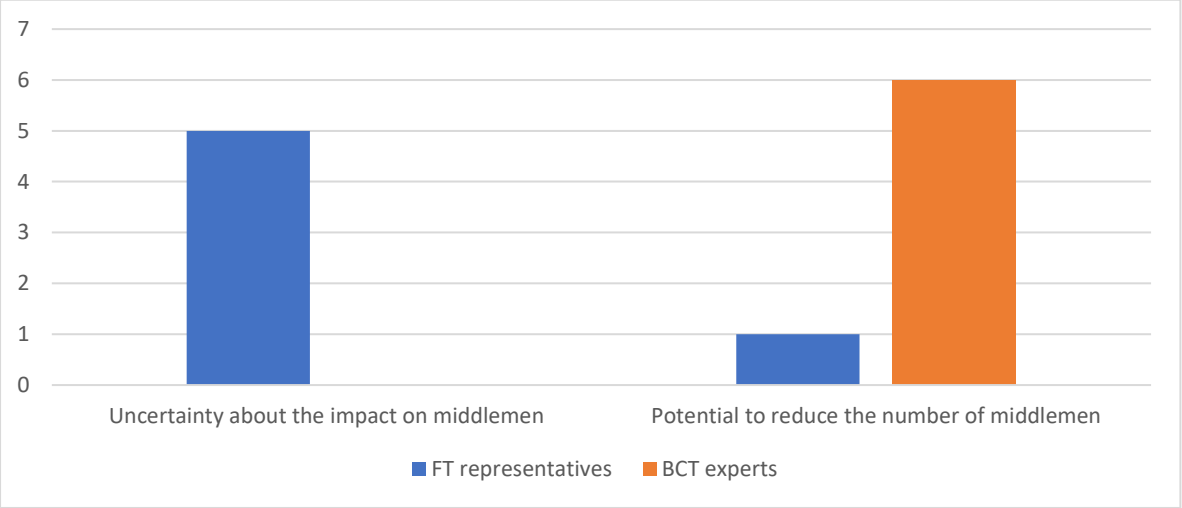

Figure 5.6: Anticipated impact on middlemen

Overall, it was found that participants were either uncertain about the impact the implementation of BCT would have on middlemen, yet they perceived that there was potential to reduce the number of middlemen. In the answers, FT representatives were more cautious in assessing the technology's impact. FT representatives struggled to predict the impact BCT would have on intermediaries. Obvious doubts could be seen via their responses.

"I'm not sure"

(Participant one)

"I don't know"

(Participant two and six)

Despite the uncertainty that came with responding to the question, some participants further elaborated on possible challenges such as middlemen's (un)willingness to share information. These challenges are presented in detail in section 5.5: Barriers and challenges as a result of implementing BCT. Furthermore, participant five illuminated that colleagues in Europe had explored the idea of BCT and concluded that for their system it would not shorten the supply chain. The participant perceived this would be the same case for FT Australia New Zealand.

On the other hand, the six BCT experts were holding rather opposing views and declared that BCT has the potential to reduce the number of middlemen in the supply chain.

"It is absolutely perfect to be implemented because it's going to eliminate intermediaries"

(Participant eleven)

Three BCT experts believed the reduction would come down to BCT utilising a peer to peer system.

> *"In terms of reducing people in supply chains, public chains have the ability to do that because you can get a direct peer to peer between a producer and a retailer, or at least reduce the number of middlemen in there"*
>
> (Participant seven)

Of the six participants, one commented on the conditions that need to be met for disintermediation to occur.

> *"If BCT is integrated with artificial intelligence and smart contracts, you are able reduce the dependency on manual tasks or manual interventions, then to some extent intermediaries are reduced."*
>
> (Participant ten)

Other participants foresaw the potential to reduce the number of middlemen in the supply chain, however, highlighted a potentially negative flow on effect on producers, as a reduced number of middlemen could increase farmers' workload of which many do not have the time or resources for. This was evident in their responses below:

"You have to assume that to get the benefit of cutting out the middlemen that as a producer you are going to have to take on more of the tasks that the middlemen would do in the process."

(Participant seven)

"I'm weary of anything that will burden them to have to do everything…I think it's unfair on the producers and they don't have the people that can do this"

(Participant one)

The benefit of cutting out middlemen was perceived as a benefit by BCT experts. Their imagined that with fewer middlemen the producers and consumers would be able to see the value chain and be able to directly interact with it. BCT experts also mentioned that the chances of this occurring are much higher in public networks, and if there is a benefit for suppliers it would come from them being able to act with scale together.

Overall, five participants were uncertain about the impact that BCT would have on middlemen, while the remaining six (BCT experts) participants believed there was potential to reduce the number of middlemen in the supply chain. However, when queried further, which middlemen could be eliminated as a result of embedding FT program onto a blockchain platform, they were not able to pinpoint to a specific intermediary. As these opinions were represented mostly by BCT experts, one needs to take the outcomes with a degree of reservation. Although BCT experts possessed sufficient understanding of the business model FT certification scheme represents, the devil is often hidden in the detail. This suggests a lack of understanding within the interdisciplinary area as depicted by Figure 5.1.

In conclusion, there was a noticeable amount of uncertainty amongst all FT representatives over degree of impact BCT could have on middlemen within FT's supply chain.

5.5 Barriers and challenges foreseen as a result of implementing BCT

When prompted with question related to the anticipated barriers and challenges that would result from BCT implementation into the FT program, participants mentioned four barriers in same proportions. These were; (1) a lack of understanding on what BCT represents, (2) cost as a barrier, (3) resistance towards information sharing and (4) farmers' lack of resources, time and money. This situation is graphically depicted by Figure 5.7.

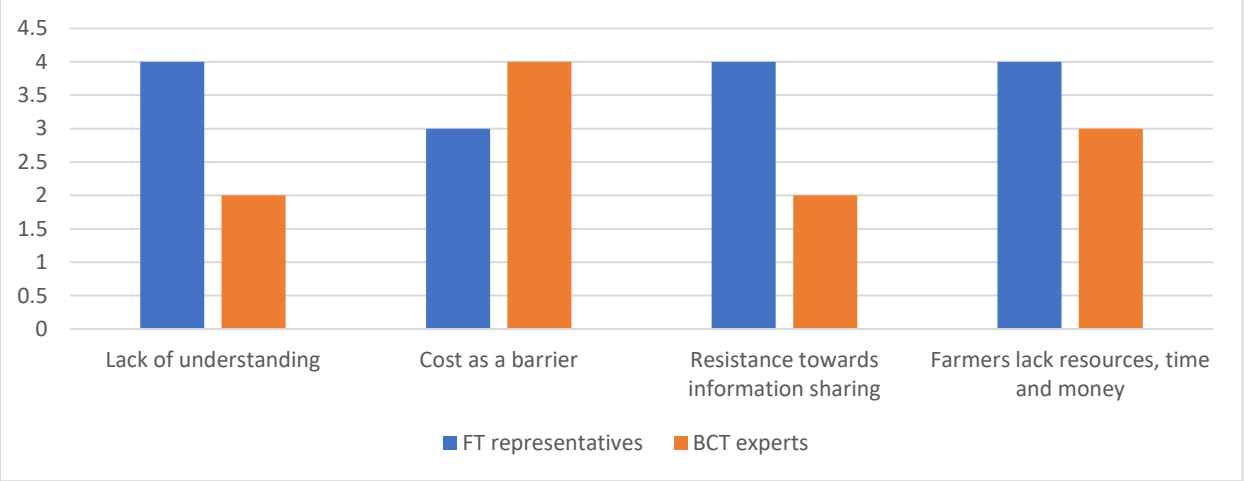

Figure 5.7: Barriers and challenges of implementing BCT

5.5.1 Lack of understanding on what BCT represents

Six participants saw the inability to imagine how BCT actually works as a principal barrier to its implementation. The literature declares that innovation done to the internet - inclusive of BCT – has been happening at the backend of users' screens and presumably this innovation should not affect user's experience when entering information onto blockchain (Prajogo & Ahmed, 2006). However, there was a noticeable uncertainty about how it all fits together because in reality, it is expected that BCT would be impacting on the processes related to handling data. All comments linked to the lack of understanding of BCT derived from this perspective. Some specific responses are presented below:

> *"First the challenges are going to be to understand how this technology actually works, you're going to invest a lot of time learning and investing, what does it do? What does it not do? How does it do what it does? How will this support business?*
>
> (Participant eight)

> *"Here in New Zealand there are very few who understand what blockchain is and how it works. So, you then take it to a third world country, are they really going to be able to be able to implement it properly?"*
>
> (Participant twelve)

A lack of understanding of BCT would require those involved in the supply chain to be educated on BCT. This was notified by a BCT expert who commented:

"Education plays an important role and those FT countries need to provide farmers or whoever wants to use this technology with an appropriate amount of education or whatever is required for BCT to be used efficiently"

(Participant eleven)

In conclusion, a learning curve is expected as a result of FT-BCT interface. This would require a significant investment in time and money for FT representatives and FT producers in order to gain confidence and trust in the improved record system. Coupled with uncertainties about capabilities BCT in respect to the technology scalability, this cast the shadow on the possible positive outcomes striving for the increased effectiveness FT's certification. This leads to the next foreseen barrier that was raised by participants being cost as a barrier to implementing BCT.

5.5.2 Cost as a barrier to implementing BCT

Seven participants showed concerns associated with the cost of BCT or concern for who would cover the increased costs of setting up BCT. This was evident in responses from participants, of which three stated:

"BCT is very pricey and we know that FT and low paid labour mainly exists in lower economy countries and in this type of countries it is hard to establish the required infrastructure for establishing BCT"

(Participant eleven)

"It can be really costly, and it is not clear who is going to be paying the costs"

(Participant five)

"Technologically it's feasible, socially it's desirable. The 1 million dollar question is, is it economically viable?"

(Participant nine)

In summary, there appeared to be a major concern for FT farmers as participants were weary of anything that would place a possibly additional financial burden on them. It does not appear that this would sit well with FT as one of its goals is to improve the lives of farmers through improved sustainable wages leading towards the living wage (Fairtrade, 2016).

5.5.3 Resistance towards increased transparency

Participants indicated that it would be a struggle to get all intermediaries along the supply chain to become more transparent and increase information sharing. More specifically, it was four FT representatives and two BCT experts who mentioned this, with some stating:

> *"You may not have someone who is willing to put the margin in, so all it does is give you traceability, it doesn't actually give you the value of the chain."*
>
> (Participant three)

> *"For Fairtrade I think there are people who are willing to say what they pay and what they do, but I wonder how all their cooperates would be to put out all this information. I think it's the higher you go up the line, the more you'll get resistance."*
>
> (Participant one)

Participant three went on to reiterate the fact that BCT is only as good as the information shared into the chain, therefore, information included onto the blockchain depends how informative it will be. As a result, if some middlemen along the supply chain are unable to share the full extent of their information there will be missing data furthermore decreasing the level of transparency that BCT offers.

5.5.4 Farmers lack resources, time and money

Seven participants, three being BCT experts and four being FT representatives shared the concern for FT farmers not having the necessary resources, time or money to undertake the steps required to implement BCT. It was foreseen by participant five who perceived that FT farmers would be willing to share their processes and practices that they were undertaking but were not equipped to do so. They further went on to state:

> *"It is not that they don't want to share the information, it is they don't know how to share the information, they don't know what information to share and they don't know how to prepare to do that. So, to prepare to do that and share the information in an accurate way it would take a lot of time."*
>
> (Participant five)

Although this statement was agreed upon by several participants, it was expressed by participant ten that there would be more difficulty with increased information sharing among

smaller farmers as opposed to larger farmers. This was simply due to their inability to share the workload around more workers on the farm, ultimately leaving it up to the owner of the farm to do all the documentation and paperwork for information to be passed on.

Of the seven participants there was also concern expressed that if BCT provides the opportunity to reduce the number of middlemen in the supply chain this would have a negative flow on effect on farmers, as according to participant one:

> *"A reduction in the number of middlemen will increase farmers' workload.*"
>
> (Participant two)

This would appear to be place a negative impact on farmers if a reduced number of middlemen increased their workload as foreseen by seven participants above farmers lack time, therefore, if a higher workload was placed on them this could possibly be detrimental and place extreme pressure on farmers. Despite a vast number of participants speaking out about the difficulty that farmers would have with increasing information sharing, participant also sensed that there would be difficulty in increased information sharing further down the supply chain.

5.6 Likelihood of adopting BCT

As a final question, participants were asked according to you, "*What is the likelihood of blockchain technology would be adopted as a part of FT's certification program?"* A number of mixed positions were observed. 67% of participants foresaw the possibility of FT adopting BCT while 33% of participants did not believe that BCT would be adopted in the near future representing a horizon of five years. Overall, these reservations were coming from FT representatives echoing issues related to duplicity outcomes of what FT program already does or records.

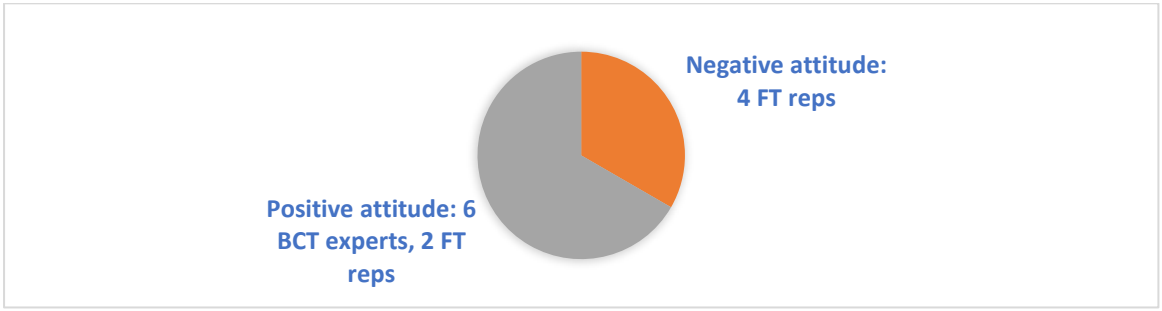

Figure 5.8: Overall attitude towards FT adopting BCT

5.6.1 BCT as unlikely to be implemented

Of the four participants who opposed implementing BCT as a part of FT certification, they were all FT representatives. When asked if there was a likelihood of implementation of BCT, participants responded:

> *"For the moment, no, it is not corresponding to our needs and we see that there are a lot of values that are too complex for us and not fitting with our system and values and how we work and it's too far away from our objectives and needs."*
>
> (Participant five)

Participant five further clarifies his position by referring to Flocert company's report two years ago that concluded that BCT did not fit FT's business needs for an extensive focus on transparency and traceability and not of the physical product, fairness or social instruments.

5.6.2 BCT likely to get implemented

On the other hand, eight participants held a positive attitude towards the likelihood of FT adopting BCT. Those with a positive attitude included two FT representatives and all six BCT experts. In response to being asked if there was a likelihood that FT would adopt BCT, participants responded:

> *"Yes, there's technology here which gives us you know incredible visibility however we chose to use it."*
>
> (Participant two)

> *"I think there is a very high probability that FT supply chains will implement BCT."*
>
> (Participant eight)

> *"Yes, of course. Blockchain is tailor made."*
>
> (Participant nine)

It became apparent that the majority of participants expressed a positive view towards FT implementing BCT as they saw potential benefits for FT, even if the contribution was only partial it is still a contribution. This was evident among responses made by participants that expressed their position due to perceiving that BCT would be beneficial based on reducing costs, increasing transparency, bringing farmers and consumers closer together, and identifying success in previous supply chains who have implemented BCT.

5.7 Participants' perceived readiness to adopt BCT

The previous sections, Section 5.6 in particular, allows me to link the qualitative findings with the TRI. Figure 5.9 displays the relative response rate of all eleven respondents. Because the underlying data had a range of a minimum of 20 comments (Participant six) which identified with the four TRI concepts to a maximum of 35 comments (Participant seven), I have chosen to use the relative response rate for it allows me to calculate meaningful summary statistics. Thus, in the figure the sum of all four bars above each participant add up to 100%. The data reflects the above findings: BCT experts are unanimously optimistic towards BCT adoption and FT representatives are mixed in their optimistic attitudes. As for the negative views, discomfort and insecurity, the latter was expressed more frequently.

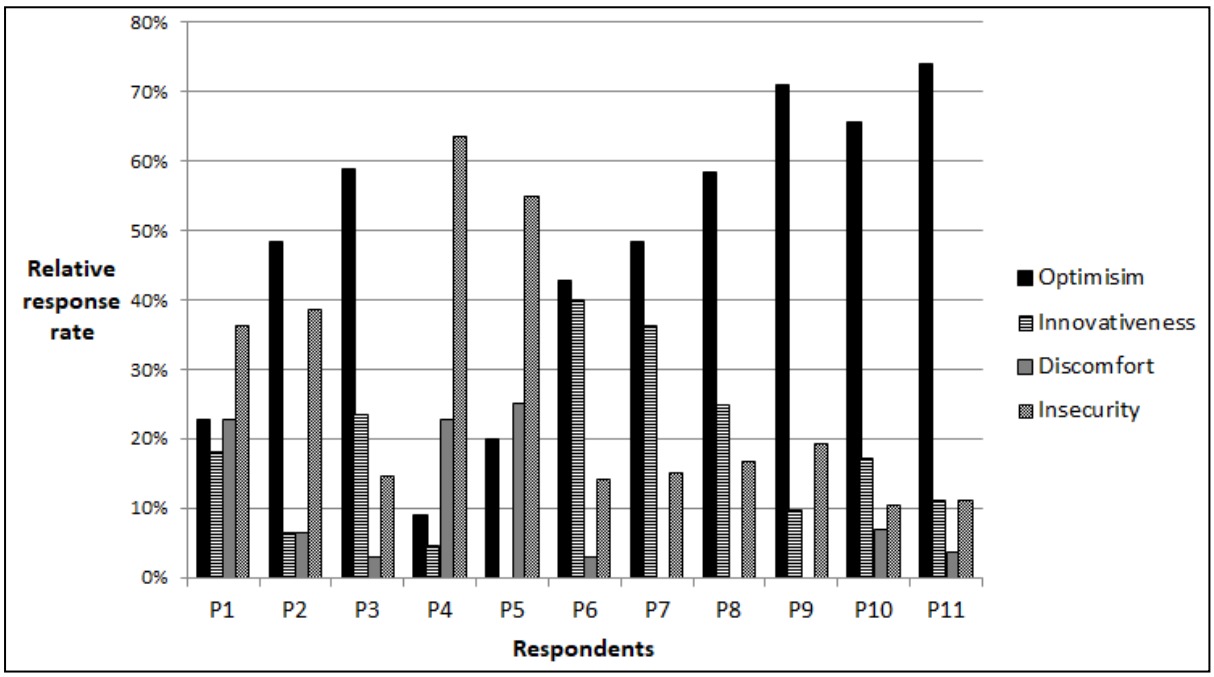

Figure 5.9: Relative response rates of FT and BCT respondents categorised by TRI concepts

The data shown in Figure 5.9 then invites an analysis about whether or not the observed differences may have been obtained by chance. The means I obtain are 33% for the positive views (optimism and innovativeness) and 18% for the negative views (discomfort and insecurity). Given the large uncertainty around those means, I thus perform a two-sample *t*-tests assuming unequal variances (1-tailed, t=2.41, p<0.01). Thus, I have found a statistically significantly difference between positive and negative relative mean views on the (dis)benefits from BCT adoption into the FT program. In context with the TRI, this means respondents' behavioural intentions suggest they favour adoption to non-adoption of BCT: however, this

suggestion would need further investigation using structural equation modelling such that the correlations are obtained between the latent constructs shown in Figure 2.5. This analysis is outside the scope of my MCom thesis, however.

5.8 Findings summary

The findings in this chapter highlighted the responses of participants in respect to five interview questions. These responses all contribute to shape the overall attitudes of FT representatives and BCT experts and help identify the themes that emerge from the data. The researcher observed that FT representatives had a lower level of familiarity with BCT. Although despite their lack of knowledge, I provided explanations of BCT that further enabled participants to comment on the interview questions. As a result of implementing BCT participants perceived that it was possible to reduce the number of middlemen as BCT utilises a peer to peer system, yet many participants also expressed uncertainty about the impact on middlemen. Additionally, it was expected that BCT would bring about improved efficiency and increased clarity with the potential that consumers could have increased awareness of their purchasing impact as a result of transparency. On the other hand many FT representatives were resistant towards the improvements that BCT could bring FT. This tended to be the case when some FT representatives spoke of increased transparency as they anticipated it as a negative aspect of FT, while the majority of participants perceived it as a positive aspect. Another major contradicting idea was increased transparency and traceability that participants either perceived as negative and positive aspects through the implementation of BCT. A number of barriers and benefits were also perceived, with four FT representatives perceiving that these barriers outweigh the benefits of implementing BCT and therefore held a negative view towards FT implementing BCT. As for the additional two FT representatives and six BCT experts they believe there is a likelihood that FT will implement BCT in the future. Therefore, the findings presented many contradicting views among participants that help identify the overall attitudes and decipher the overarching themes of the data that will further be discussed in the following Chapter Six.

CHAPTER SIX – DISCUSSION AND CONCLUSION

6.1 Introduction

This chapter interprets and discusses the findings of the thesis in respect to the themes presented in Section 4.2.3 (Chapter 4) and their relevance to FT program. The purpose of this study was to investigate FT representatives' and BCT experts' attitudes. The previous chapter outlined that BCT experts were unanimously optimistic towards BCT adoption, whilst FT representatives were more prudent and held both optimistic and pessimistic attitudes. The negative views voiced particularly insecurity issues along with signs of discomfort to adopt BCT into FT's program. Furthermore, I state my research contributions to academic literature along with practical implications and potential limitations to the research. This is followed by presenting opportunities for future research. The summary of this thesis is provided in Conclusion section 6.5.

6.2 Discussion of themes

Respondents' perceptions over BCT's potential to positively enhance the outcomes of FT's certification program can broadly be categorised into five groups. These categories represent unique themes, albeit showing some overlap with respect to the respondent's position on a particular issue. Thus, the themes can be seen as interrelated and indicating a broader positions towards BCT's impact on FT's scheme. These "overlaps" are depicted by Figure 6.1

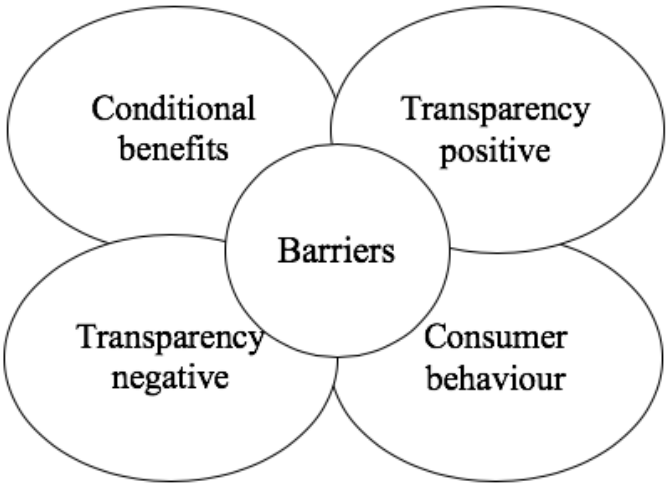

Figure 6.1: Overlap of themes

Overall respondents held mostly positive attitudes towards the benefits of BCT as they referred to the benefits of increased transparencies resulting from the transactions embedded into BCT. Yet the findings show that it is the BCT experts who represent a more positive views towards expected outcomes related to BCT‘s adoption into FT program. It is possible to interpret BCT experts’ positive positions for their enhanced understanding of the technology and a better imagination on its potential benefits. However, as the technology crosses many disciplines, BCT experts may not possess sufficient knowledge of the realities that create uneven trading power between farmers in a developing country and subsequent merchants in the supply chain. Although most respondents, including the FT representatives, showed positive attitudes towards the technology, these were often conditional or accompanied by a number of perceived barriers.

6.2.1 Transparency positive

Majority of participants argue that transparency would bring an immense amount of positive benefits to the FT certification if embedded in BCT. Respondents mentioned that increased transparency, clarity and efficiencies would help to verify individual progression steps within FT certification program and even possibly reducing the number of middlemen in the supply chain. However, respondents were unable to answer what kind of intermediaries BCT would eliminate. Although it is often mentioned that increased transparency would lead to increased clarity and efficiencies in FT certified supply chains (Kravitz, 2017), one wonders to what extent FT might be identified as an additional intermediary or a middleman in future? Therefore, the next big question that FT should ask itself is, what is FT’s added value within the supply chain? Does not implementing BCT potentially represent a threat to the program’s existence?

Or perhaps considering the issue from less of an existentially threatening perspective, for FT how might increased clarity (Yeoh, 2017), represent an opportunity for FT to improve its certification system to enhance the certification’s outcomes? Given the respondents’ inability to elaborate in detail on the implications related to the benefits of increased transparencies, one may appreciate the uncertainty or unwillingness to specify further predictions on embedding FT certification program into BCT. The following subsections discuss this matter in more detail.

6.2.1.1 Increased transparency

All Participants agree that BCT would bring increased transparency and increased clarity. It is hard to argue that transparency is undesirable as this would ultimately give FT control over auditing, verifying its certification and health and safety standards. Moreover, improving FT’s insights into the processes and practices that are undertaken along the supply chain. This is consistent with what BCT is trying to achieve and supports literature from Baralla et al. (2020) who state that through the implementation of BCT goods are tracked at every step of the way, in turn providing clarity on the goods.

Providing increased transparency and clarity could further enable FT to improve its reputation as consumers would be able to see how open FT's program is towards reducing information asymmetry. These findings align with Kamilaris et al. (2019) who stated that BCT could assist in developing systems based on reputation. This is said to be the case as BCT encourages middlemen to improve their behaviour and strengthen their reliability and commitment (Underwood, 2016). Consequently, making BCT the right fit for FT as FT Australia New Zealand have a powerful reputation among ethical consumers (Coffey, 2016) that can be strengthened even more so through the implementation of BCT.

Further, transparency can eliminate counterfeit products, in turn enabling consumers to see that products purchased through a BC supply chain are authentic (Pun et al., 2018). This could prove to be highly beneficial for FT and their customers as it will reassure consumers that the FT commodities they purchase are authentic. Authenticity of FT commodities can be tracked trough BCT, to monitor the quality of such goods in a transparent way (Galvez et al., 2018).

6.2.1.2 Increased efficiency

On the other hand, respondents predicted that increased transparency would lead to increased efficiency. This would allow tracking of a product's journey from the point it leaves the farm to the point it meets the consumer (Baralla et al., 2020). The efficiency would be assessed based on the data related to a given product and rewards executed via smart contracts (Allam, 2018).

Respondents believed that improved efficiencies could also lead to altering the number of middlemen within FT's supply chain, hence streamlining the process. If BCT would increase transparency along the supply chain, enhanced visibility of the value chain would reveal how much value individual middlemen are adding. As proponents of BCT promise (Sklaroff, 2017) intermediaries with little, unjustifiable or no value added could see themselves to be cut out, consequently shortening the supply chain. Such findings align with the literature, as BCT does not require a centralised body or single party who controls and holds the information (Shermin, 2017), therefore removing a player from the supply chain. Consequently, such model allows for spontaneous trading between participants that have a lack of trust or do not know one another (Voshmgir, 2019). Voshmgir (2019) further go on and specify that smart contracts enable automated decision making that would allow centralised organisations such as FT to operate under "business as usual" model whilst increasing efficiency. However, FT represents a centralised organisation with headquarters in most developed countries

6.2.1.3 BCT can help verify FT

FT representatives perceived that BCT would be able to help verify FT certification. Essentially BCT could speed up the verification process during the certification. This would provide a transparent way for FT to showcase that the correct processes and practices are followed and are aligned with FT's

guidelines. Ultimately, this may lead to less time for certifiers spent on site and checking necessary paperwork related to FT's guidelines. Consequently, this could lead to cost savings for FT, reducing the price charged for certification.

For example, an organisation with the same purpose and aims as FT have already utilised BCT to track their goods. Known as FairFood, the organisation gathers data that assists in making claims and verifying information that presents the value of the chain (FAIRFOOD, 2020). Therefore, utilising BCT to help verify their processes have been further advanced and expanded into Ethiopia, Colombia and Indonesia, presenting itself as an example of how FT can utilise BCT for improvements in their certification system.

Verification process however can be skewed even on a blockchain platform (Pereira et al., 2019) According to Kshetri (2018) in the hypothetical case of a toy shipment "if you can drill a hole in the container, take out all the teddy bears, and replace them with cocaine, the blockchain won't catch that." BCT is about all of the paperwork and data that represents physical products along the supply chain, although as identified in the example above the person-system interface is a limitation to BCT. Therefore, it is the interface where humans enter data onto blockchain platform that represents the weakest link towards the enhanced transparency (Balzarova & Cohen, 2020). If faulty information was recorded for whatever reason, the inability to delete the record might harm the party and negatively impact on his/her reputation (Srivastava et al., 2018).

6.2.2 Transparency negative

Despite the vast majority of participants agreeing that increased transparency would bring ample benefits to FT as a result of implementing BCT, there was also a number of participants that held a negative view towards transparency. A notable proportion of participants foresee it as a negative aspect, consequently there was resistance towards information sharing from FT representatives that led to participants exercising caution around increased information sharing.

6.2.2.1 Resistance towards information sharing

Increased transparency may reveal too much and lead to consumer information overload - leaving consumers more confused than before (Oehler & Wendt, 2017). Particularly with respect to the income of farmers, how are consumers going to understand how their purchase is truly impacting farmers and to what extent are they improving their quality of life from purchasing FT commodities if they do not understand the value of money in third world countries? This may lead to consumers questioning if FT wages are actually fair. Additionally, respondents shared concerns related to possible increase exposure towards the program's inefficiencies that could lead towards undesirable boycotts led by NGOs or various consumer groups. Given FT's openness in reporting on "unsuccessful" outcomes already, one

would not expect a great deal of backlash as a result of increased transparency. These issues were however raised by a small number of participants, but need to be acknowledged as a negative perception representing a threat to the FT program.

In a similar vein, increased information sharing may spark additional questions from consumers, as it may appear that previously missing information was intentionally hidden by FT. This can be attributed to an increased lack of trust from consumers surrounding eco-labelling brands such as FT (Thøgersen et al., 2010). These findings are coherent with the literature. For example, Kamilaris et al. (2019) confirm that consumers are becoming less trusting.

6.2.2.2 Resistant towards FT's improvements as a result of BCT

BCT represents a novel technology that is following trends of any previous innovation or innovative technology. As such there are still uncertainties in terms of what BCT has to offer. Therefore, many FT participants acknowledged that they were unaware of the full potential BCT represents and what it could mean for FT's program. This could offer an explanation on why most of the FT respondents were holding reservations towards BCT's potential to improve FT's program. With confidence in the current system that FT does enhance the livelihoods of FT farmers and their wider community, participants do not see a need for FT to look towards another technology that would improve their certification. This outcome can be seen consistent with advice given by a number of authors who advise organisations to hold on with BCT implementation in case their current systems are seen as sufficient and not strategically critical for future of the business (Mulligan et al., 2018).

5.2.2.3 FT lacks traceability

It has been identified by participants that there is a lack of transparency along the full extent of the supply chain. Many participants foresee this is the case as there is difficulty in increased transparency, consequently resulting in the opportunity that transparency will not increase, particularly in respect to the farmers. BCT offers a solution to this, as it is there for the purpose of increasing transparency and traceability (Nugent et al., 2016). If FT decide to implement this technology they are the ones with the power who can enforce what sort of information they would like share onto the blockchain. This will further meet the needs of consumers who are demanding increased information sharing (Astill et al., 2019) with the potential to build a trusting relationship between producers and consumers (Papaoikonomou & Ginieis, 2017).

6.2.2.4 Concerns about information validity

There was an underlying agreement that participants were concerned about information validity as the information that is entered onto the blockchain is not audited. Ultimately, this could mean false

information is entered onto the blockchain, whether this be human error or a vested interest that middlemen have to share incorrect information this leads to a transparent incorrect data. Will this information be audited by FT? And with middlemen still able to cheat the system and provide inaccurate data will this result in further distrust from consumers? This is consistent with literature that states it is the interface between humans and BCT when fraud is likely to occur (Balzarova & Cohen, 2020).

6.2.3 Barriers

Respondents foresee three perceived barriers that FT would face if BCT was implemented. These included; (1) a lack of understanding on what BCT represents, (2) costs as a barrier to implementing BCT and (3) farmers lack of resources, time and money.

6.2.3.1 Lack of understanding on what BCT represents

Most of the FT representatives admitted that they could not fully imagine what the technology is about nor how to use it. Majority of the participants admitted that they have little awareness or understanding about the technology. With participants speaking of their uncertainty on the topic of BCT, it became apparent that one of the first challenges FT would need to overcome would be to (1) understand how the technology works, (2) how it has the potential to help improve their certification and (3) the potential barriers of implementing BCT. With a lack of understanding coming from Australia New Zealand FT representatives, there is concern that there is also a lack of understanding among FT producers living in third world countries. What this might mean for FT is spending a sufficient amount of time, money and resources to gain a deep understanding of BCT, from the opportunities it offers to the additional barriers that they will need to overcome. There is a perception that familiarization with the technology would be taking farmers away from their farms to learn about the technology, and it is expected that many would struggle to find the time to do so. Is it realistic to pass this technology on to FT farmers and are they equipped to take it on?

However, BCT is seen as an innovation that is happening at “the backend of our monitors” and is claimed not to affect the user at the frontend (Voshgmir, 2019). So this task may not be as demanding as it is feared. Nevertheless the devil is often hidden in the detail and one would anticipate some learning to occur during a transition towards using BCT. Most start-up companies fail within their first year of existence (Chernev, 2020) and although these start-ups may not be related to monitoring agricultural products, this trend represents a worrisome indication that FT as an established organisation should watch for.

6.2.3.2 Cost as a barrier to implementing BCT

The financial investments are significant (EY, 2019), and a lack of understanding into what people are investing in is a clear barrier to BCT implementation into the FT program. The question that also comes to mind is who would be funding the adoption of BCT and what might be required of farmers additionally to be a part of sharing their information onto the blockchain? Essentially it would be FT enforcing the extent to what information is required to be shared, and with many not having the necessary resources, time and money this could prove to be relatively difficult. Although there are significantly large start-up costs involved with the implementation of BCT (EY, 2019), once the technology has been fit to the organisation, there is seen to be 70% - 90% on cost savings (Antonucci et al., 2019). This was also shown to be the case when Perboli et al. (2018) presented the implementation costs of blockchain compared with the outcome showing that it is highly sustainable technology.

6.2.3.3 Farmers lack resources, time and money

This is just on the side of the FT program, but if we look at the farmers' perspective implementing BCT would also represent significant costs, resources and time. And currently dealing with farmers in developing countries that financially struggle already (Fairtrade Foundation, 2020) where would the money come from and where would the support come from if we cannot guarantee that farmers have technology that would enable them to share the information. This is in line with literature that has previously specified 52% of cocoa farmers live in poverty as they are earning on average below US$1 per pound (Meemken et al., 2019). Such low incomes result in consequential impacts on producers livelihoods. This presents a great concern that implementing BCT would place an additional workload onto farmers that they may not have the time for as it needs to be spent on their farms.

6.2.4 Consumer behaviour

Another significant factor that is influencing the implementation of BCT is the consumers, as they play a large part in representing the demand (Sander et al., 2018). The issue that stands here is that consumers are being overwhelmed and feeling confused by the amount of information out there. There is a lot of scepticism around the labelling schemes (Balzarova & Cohen, 2020), a lot of greenwashing (Delmas & Burbano, 2011) and greenwish (Austin 2019). Consumers report that they don't know which label to trust because they find themselves bogged in fine detail. Consequently, this led to the creation of polarity between consumers who are demanding more information in the hope to understand the labels while others choose not to be interested in the fine details.

6.2.4.1 Consumers demanding increased transparency

There is a heightened demand for increased transparency. Consumers may be expressing a demand through increased transparency as they do not have sufficient trust in brands and want to know the finer

details of what is happening at the farmer level. Purchasing many food items represent low a cognitive engagement process and it is likely that consumers would use ecolabels, such as FT, as heuristics or a rule of thumb to assist them in easily reaching a purchasing decision (Chaiken & Trope, 1999). Such ecolabels typically served as major instruments to address a problem that would be related to food safety or quality (Verbeke & Ward, 2001) such were the seals of approval during BSE crisis on meat labels for inferring credence quality (Becker, 2000). With time, consumers have strived to increase their understanding of the impacts eco-labelled products (FT certified including) have on other peoples' livelihoods (Maloni & Brown, 2006). Thus, perceived lack of understanding over eco-labels' impact leaves consumers wondering whether their purchases adequately contribute to farmers' fair wages?

Should there be sufficient transparency on cumulative benefits yielded by specific farmers or their cooperatives, consumers may gain sufficient confidence in purchases they made through a program such as FT. Again, this is in line with literature suggesting that BCT may offer a solution to help small farmers through hyper-transparency that offers a commitment to improving the livelihoods of farmers (Kos & Kloppenburg, 2019).

6.2.4.2 Consumers lack of interest in the fine details

Literature shows that consumers are increasingly interested in knowing where the goods they are purchasing come from (Astill et al., 2019; Behnke & Janssen, 2019). This was evident among a study undertaken on BCT in food supply chains that found more information is being demanded by consumers regarding products quality whilst assessing sustainability levels (Kohler & Pizzol, 2020). However, instead of exploring the phenomena of whether and what proportion of consumers are interested in increased transparency, traceability, quality or origin of purchased products that accompanied ecolabels, such as FT, one may wonder what is the threshold consumers may accept in terms of processing information in relation to their purchases. Consumers face information overload (Malhotra, 1984; Gracia & Barreiro-Hurlé, 2019) and an excessive amount of information limit consumer information processing abilities (Caswell, 1998) which may deter consumers from making optimal choices with their preferences (Roe & Teisl, 1998). Consumer information overload or a lack of interest in studying fine detail provided by FT was consistently mentioned by FT's representatives. This was perceived as a significant barrier underlined with tension on how much information may be provided on the FT label – representing a seal of approval and hence being seen as a trusted extrinsic cue related to a program that addresses purchasing inequalities within its supply chain. This is consistent with research exploring area limitations on the label place and risks related to information overload as a potential danger (Salaün & Flores, 2001). Adding to this, consumers may choose to remain rationally ignorant (McCluskey & Swinnen, 2004) because the efforts exerted with cognitively processing provided information, exceeds the expected marginal benefits.

6.2.5 Conditional benefits

Overall, respondents held positive attitudes towards embedding FT program onto a BCT platform. However, this consensus was typically accompanied by prerequisites that represented conditions that need to be met before desired outcomes would be achieved. These conditions were mostly not BCT as such they would encompass; necessary behavioural changes amongst participants in the SC, quality of the information shared amongst participants, issues related to learning of individuals and/or organisations and the necessary resources farmers would require in order to increase transparency.

6.2.5.1 Behavioural changes dependant on the SC

Respondents identified that in order to get the benefit of trustworthy data it is recommended that BCT is implemented. This is in alignment with what the literature says, as Kamilaris et al. (2019) found that by implementing BCT the behaviours of middlemen improved, resulting in increased reliability, responsibility and commitment. Therefore, behavioural changes result depending on different circumstances. This was identified in the findings with participants agreeing that if BCT was implemented, middlemen would adjust their behaviours in a positive direction. Although BCT may encourage behavioural changes there are questions related to the ethics of middlemen that they will curb the system as long as it allows them too. Therefore, it is expected that BCT would not provide a 100% fraud-free guarantee and misconduct may still occur along the supply chain (Cai & Zhu, 2016). Again, it is the interface where BCT meets the human that represents the weakest point for this technology. It is where faulty information may be entered, and as such BCT is simply a platform for storing data (Figorillo et al., 2018). Despite the decentralised nature required for entering a new piece of information onto the blockchain, verification of outside conditions such as use of child labour, the types of pesticides or fertilizers used for plants, middlemen harassment or other issues, these cannot be verified by remote participants operating the network. As long as those issues cannot be monitored by digital sensors communicating with the grid, potential for unethical fraud and behaviour will remain. Such observations are consistent with the literature depicted by Rossi et al. (2019).

6.2.5.2 Increasing farmers negotiation power

Respondents foresaw a possibility that BCT would enable farmers to gain a greater insight into what is happening with their products once it leaves the farm. Perhaps increasing information sharing could leverage their negotiation power with people that come and buy products from them? In the current supply chain, farmers lack negotiating power and most often the value is realised by actors in developed countries at the end of the supply chain during final processing such as roasting coffee beans or among retailers (Omidvar & Giannakas, 2015). Ironically, farmers should hold the ultimate power because they own their lands and they are the ones who produce the goods yet lack the trading power to negotiate higher prices for their products. In this sense, if farmers and possibly even consumers had insights into

pricing policies along the supply chain, this might change the recognition of the work the original producer put forth. Literature does not dismiss the possibility of this approach. On the blockchain platform, there can be various levels of visibility introduced for actors within the supply chain (Voshmgir, 2019). This probably would have to be decided by the FT program to what degree information should be shared and by whom? Such level of visibility may increase the farmers' negotiation power () but may lead to unexpected outcomes – for example, consumers' decreased loyalty towards FT certified products as a result of perceived program's inefficiency to financially recognise farmers' input at adequate level.

6.2.5.3 BCT is only as good as the information shared

Another condition necessary that would need to be met to grasp the benefit of an information transparent supply chain would require the cooperation of all agents in the supply chain and their willingness to record information onto the platform. This may be a challenge because there may be middlemen who are not willing to participate and record their margin onto the blockchain platform. So, although transparency would be increased, the value of the chain, who is contributing and what kind of percentage the people are getting would not be captured (Respondent 3). That being said, BCT is only as good as the quality of information recorded on it (Balzarova & Cohen, 2020). Hence a careful consideration would need to be taken to decide what kind of information is desirable for permanent recording and increased transparency. This essentially represents a unique opportunity for the FT who could enforce changes in the types of information logged onto the blockchain and to what extent information should be shared. Additionally, information and the level of detail that has not yet been made available to consumers could provide a benchmark for alternate offers in the marketplace. In conclusion, there is an underlying consensus that the information that would be shared on the blockchain would provide consumers with a more enriching buying experience (Zavolokina et al., 2019) whilst enabling farmers to see where their goods are going once they leave the farm (Galvez et al., 2018). Additionally, such visibility would allow consumers to give direct feedback to a producer and report on customer satisfaction.

6.2.5.4 Innovation technology learning curve

BCT is a new technology. As such, it represents an innovation that is expected to follow the same path for growth and scalability as any previous innovative technologies. This is consistent with literature that discusses the Gartner Hype cycle that elaborates on how technology evolves over a ten year period (Dedehayir & Steinert, 2016). For example, just as the internet once came to its existence in the early 1990-ies (Andrews, 2019) it took about ten years for the technology to evolve before it made its presence in the form we know it today. Consequently, there is always a learning phase associated with figuring out the opportunities a particular innovation possesses, what it can deliver and what pitfalls

may be identified with it. Participants agreed that BCT is expected to follow the same pattern. This past decade, BCT has shown to disrupt systems and social relations, leaving many concerned over the influence these disruptions will have on behaviours of consumers, people and organisations (Frizzo-Barker et al., 2020). As the technology is expected to mature, a number of adjustments will need to be addressed. For example, BCT will need to be integrated with national regulations reflecting economic, social and environmental values, not only home countries such as Australia and New Zealand but in the developing countries where the commodities are produced (Hang & Kim, 2019).

6.3 Themes in relation to the TRI

The themes that capture respondents' views towards the technology's adoption into FT's program mostly abridge the four dimension of TRI. The only theme that does not seem to fit in the TRI framework reflects on consumer behaviour. Respondents brought consumer behaviour and their expectations on increased amount of information related to goods' production as a factor that could influence the reasons for the technology's adoption both in positive or negative way. There were concerns raised in respect to consumer information overload (discomfort) or revealing too much about FT program's inefficiencies (insecurity). On the other hand optimism and innovativeness were highlighted via enabling consumers to understand the impact their purchases have on the producers. But in the end, the theme of consumer behaviour has always come across as an independent factor to TRI. The following summary relates the TRI framework to the remaining four identified themes.

In assessing participants responses against the TRI it became clear that among interview responses that there was a high frequency of positive views towards increased transparency. This may have come down to the flow on effect that transparency has; which participants identified as increased traceability, improved efficiency, the ability to reduce the number of middlemen in the supply chain and the potential that BCT can verify FT certifications. Innovativeness was further expressed among participants as three participants discussed that BCT may be able to verify FT. This is in line with the literature from Cole et al. (2019) who has stated that NGO's such as FT will no longer be required to certify their commodities as BCT can automatically can do this. Even though participants perceived that there were conditions that need to be met in order for the FT program to receive the benefits of BCT, there was a level of optimism as well as a slight degree of discomfort among participants. In expressing their perceptions and attitudes, the discomfort came through in participants whilst speaking of the conditions that need to be met, as there was not complete trust in blockchain

that the benefits would be received right away. Although participants were optimistic that if these conditions were met then FT would receive the intended benefits if they were to adopt BCT. There was an underlying level of discomfort towards the adoption of BCT, based on FT representatives' lack of knowledge on what BCT represents. Although their views may be negative as they remained unaware of the full extent of BCT's capabilities, it became evident that the FT representatives were overwhelmed by the innovative technology. Secondly, many participants indicated a level of insecurity towards BCT as they do not think it could be adopted by FT due to; implementation and ongoing costs, farmers lacking resources, time and money and resistance from middlemen to share information. Consequently, among expressing negative views participants were especially sceptical about BCT's ability to work properly. Additionally, participants expressed insecurity towards increased transparency as there was concern that information would be made available to the public and this could potentially cause a negative response for FT. Consequently, due to participants' feelings of insecurity, they expressed resistance towards FT's improvements as a result of BCT and information sharing. With further regard to information sharing, respondents discussed their concerns in respect to how information would be audited. Therefore, communicating a degree of scepticism and distrust towards BCT's ability to transparently share accurate data. Therefore, insecurity has inhibited their motivation to accept BCT as a solution to improve FT's program.

6.3 Limitations

There are a number of limitations related to the study. Firstly, the results of this study are based on a limited number of participants – twelve. Although the researcher interviewed all possible FT representatives, the findings reflect the positions of participants living in two countries and geographically represent the Australasian region. Therefore, these results cannot be generalizable for other trading regions such as Europe or the North America.

Furthermore, it became evident during the interviews that the majority of FT representatives lacked sufficient knowledge on BCT, in turn making it very difficult for participants to answer specific questions. Although the researcher illuminated the participants with additional information on BCT, the content may not have been conveyed efficiently, and there were no tests carried out on participants to see how well they absorbed new details on the technology. Therefore, some views presented on discussed issues could be hindered due to a lack of understanding of implication BCT potentially represents for the FT program.

This study was conducted solely on FT certification program and cannot be generalised onto other certification schemes such as organic, sustainable winegrowing New Zealand or AvoGreen.

6.4 Suggestions for future research

The researcher foresees a number of avenues that could build on this study. In order to identify a shift in attitudes towards the novel technology, one could replicate this study following the same method process specified in chapter three in the future.

Additionally, there is an opportunity for this study to be undertaken in different countries where a comparison could be drawn between Fairtrade Australia New Zealand and Fairtrade Europe or America. This comparison would assist Fairtrade International in the understanding of what different countries attitudes are there towards BCT and if there are any major differences between countries. Such information could prove to be beneficial for FT International if they decided to look to implementing BCT, as it will allow them to see how knowledgeable and accepting participants would be towards BCT.

Furthermore, as stated by participant four it is FT International who make such decisions about the implementation of new developments to FT certification. Therefore, the findings will further prove to be beneficial for FT International as it will aid in their decision making if they decide to look at implementing BCT in the future.

As this study cannot be generalised to further certifiable schemes in which enhanced visibility in their supply chains would be desirable for quality control or other specified reasons. This could help to develop deeper rapport on how certifiable schemes adjust to BCT and further aid in assisting FT certification in comprehending how suitable BCT is for them.

Lastly, research could be undertaken to discover how much information is enough for consumers. Additionally, what is the important information that consumers want to know about a given commodity? This could prove to be extremely helpful for FT certification as when it comes to consumers wanting increased transparency, this will enable them to understand what kind of information they should spread out to consumers so it enhances the power of FT program, giving leverage on the practices that are adopted in developing worlds to increase information.

6.5 Conclusion

This thesis set out to investigate FT representatives and BCT experts' attitudes towards BCT as a potential to improve FT certification. There are differences in attitudes depending on the background expertise of the respondents. 67% of FT representatives hold an overall negative attitude towards FT implementing BCT, while the remaining 33% of FT representatives and 100% of BCT experts have a positive attitude towards FT implementing BCT. These dichotomic attitudes toward the technology were further described by a number of thematically generic positions that emerged from the narratives of interviewed participants. These themes were discussed in Chapter five.

The researcher discussed attitudes in response to; participants level of familiarity with BCT, potential to reduce the number of middlemen in the supply chain, potential to improve FT farmers lives, challenges and barriers foreseen with the potential adoption of BCT, benefits to FT as a result of adopting BCT, the extent to which it would be possible for farmers to communicate information, whether total disclosure of the information would benefit or harm FT certification, the impact on middlemen and the likelihood of FT adopting BCT.

On top of this, the five main themes that emerged from the data as explicitly seen above in section 5.2 were discussed, comprising of; conditional benefits, transparency positive, transparency negative, barriers and consumer behaviour. Participants perceived a number of conditions that needed to be met in order for FT to experience the benefits of BCT, following this, it was foreseen that increased transparency would prove to be both beneficial as well as a threat, therefore resulting in numerous barriers to overcome. Lastly, consumer behaviours were discussed in relation to transparency with some perceiving it was demanded, while others contradicted the idea. These themes represent the overarching ideas that come out of the data, contributing to a new light of literature.

The findings in this report detail the attitudes of FT representatives and BCT experts that could provide FT Australia New Zealand with valuable information on their representatives' attitudes towards the implementation of BCT. Furthermore, as stated by participant four it is FT International who makes such decisions about the implementation of new developments to FT certification. Therefore, the findings will further prove to be beneficial for FT International also as it will aid in their decision making if they decide to look at implementing BCT in the future. In order to encourage this change, it is recommended that additional research should be undertaken in this space. Or more specifically, a replication of this study could be carried out in other countries in order to gather an extensive data set that would enable FT International to assess different attitudes towards the adoption of BCT as a part of the FT certification around the world.

Due to the scope of the research, FT representatives' and BCT experts' attitudes on BCT as a potential to improve Fairtrade's certification were established. The attitudes were established during interviews with participants, where the researcher asked a number of questions in relation to different aspects of BCT in relation to FT certification. These attitudes were established in the findings, while a deeper explanation of the meaning of participants attitudes were provided in the discussion. Now that there is research completed in this field, this provides a basis for future researchers to build on in a number of ways.

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APPENDICES

Appendix one - Interview questions

1a. "*To what extent are you familiar with the Fairtrade program"?*

Question asked to blockchain experts

- Familiar
- Reasonably familiar
- Unfamiliar

1b. "*To what extent are you familiar with blockchain technology?"*

Question asked to Fairtrade representatives

- Familiar
- Reasonably familiar
- Unfamiliar

2. "*What outcomes would you anticipate as a result of BCT adoption into FT program and into its certification process?"*

A probing question in case the respondent struggles to answer the question.

Apart from these, can you foresee any specific benefits BCT could bring to Fairtrade's goals?

3. An often cited cause of producers' unfavourable trading power is linked to the extensive number of intermediaries along the supply chain. Imagine, if blockchain technology would provide information about financial remuneration in relation to reported (or perceived) added value by different actors within the supply chain, can you anticipate…

"What impact on the middlemen do you foresee as a result of the implementation of blockchain technology into the certification process of FT program along the supply chain?"

4. "*With the possibility of adoption of blockchain technology what challenges/barriers do you foresee, if any?"*

Probe the respondent to justify his/her answer.

"Why do you think so"?

5. Based on your experience with Fairtrade, "*what is the likelihood blockchain technology would be adopted as a part of Fairtrade's certification program?"*

If yes; *"what kind of time horizon do you foresee for Blockchain technology's adoption?"*

If no, *"why so?"*

E.g. is this because Fairtrade as a company has already decided against it?

Appendix Two – Information provided to FT representatives who lacked an understanding on BCT

Blockchain technology definition:

BCT is a decentralised ledger that stores data and information of transactions that is made accessible to anyone. The shared information is displayed in a block that not one singular person owns or regulates, therefore, once the information is placed in the block it is unable to be changed, tampered with or falsified. This protective measure makes it increasingly difficult for potential hackers to corrupt the database and spread dishonest information. Therefore, enabling trust through a robust system that can be tracked on an international level. The data is then able to be dispersed to allow individuals access to the information which can be achieved without trusted authority. It is anticipated that BCT is going to bring a revolutionary shift in the way that transactions are carried out in the supply chain as it provides improved transparency and traceability by removing disadvantages of trust issues along the supply chain. Additionally, it shortens supply chains to help achieve efficiency along the supply chain as well as resulting in increased profits for producers at the beginning of the supply chain due to fewer intermediaries.

Transparency in blockchain technology:

BCT provides businesses with the opportunity to track the full extent of the supply chain whilst establishing links between the processes that particular goods undergo at each stage of the supply chain. As a result, transparency encourages the improved flow of information and adds value to the supply chain. This dynamic transparency further incorporates the aspect of corporate social responsibility (CSR) through collaboration of producers and stakeholders.

Traceability in blockchain technology:

Blockchain technology works by exposing decentralized traceability systems to make all data available. BCT uses a chronologically ordered system, where information is stored in a linear form. Once information has been shared into a block, it is then unable to be tampered, falsified or deleted, therefore, becoming a permanent record that ensures data is completely transparent and verified. Therefore, allowing you to track the exact processes that take place at each intermediary in the supply chain.

Appendix Three – Cover letter

Department of Business and Law
Telephone: +74 27 2246126
Email: dyercelia@pg.canterbury.ac.nz
HEC Ref: 650.13

To whom it may concern,

My name is Celia Dyer and I am working towards a degree of a Master of Commerce at the University of Canterbury. I have a great interest in the area of sustainability and your organisation serves as a leading market-based initiative facilitating efforts to end poverty, protecting people and the environment.

With the recent introduction of blockchain technology to commerce, many foresee blockchain technology to deliver unprecedented changes to transparency, traceability and the manner we conduct business. Given your efforts and activities carried in the developing world, through my research, I wonder what your position is on the uptake of blockchain technology in the Fairtrade program. I am seeking to talk to experts that can envisage what kind of challenge an uptake of blockchain technology would represent for Fairtrade's program and to what extent you can envisage this happening?

If you agree to participate in my research, I acknowledge treating your answers in confidence and in a way that your answers would not trace back to respondent's taking part in this study. I foresee my interviews to last between 30-45 minutes.

In case you have any additional questions, please do not hesitate to contact my supervisors Associate Professor Michaela Balzarova and Michael Falta.

Contact details:

Associate Professor Michaela Balzarova
Michaela.balzarova@canterbury.ac.nz
+64 33 693122

Associate Professor Michael Falta
Michael.falta@canterbury.ac.nz
+6433693734

Thank you for taking the time to consider taking part in my research
I look forward to hearing from you.

Kind Regards,
Celia Dyer

Appendix Four – Information sheet for blockchain experts

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Department of Business and Law

Telephone: +64 27 2246126

Email: celia.dyer@pg.canterbury.ac.nz
30-09-2019

HEC Ref: 650.13

Investigating New Zealand and Australian Fairtrade representatives' and blockchain technology experts' attitudes towards blockchain technology as a potential to improve Fairtrade certification

Information Sheet

My Name is Celia Dyer and I am currently studying a Master of Commerce at the University of Canterbury. I am conducting my research in the field of Fairtrade and blockchain technology with the purpose of discovering blockchain technology experts' attitude towards blockchain supply chains as a potential to improve Fairtrade certification. Through an analysis of the literature it has been found that blockchain supply chains have the potential to improve Fairtrade certification in a number of areas. These areas of concern include the low "fair wages" farmers are receiving, the extensive number of middlemen in the supply chain, a lack of transparency and traceability along the supply chain and the social impacts these are causing in return. Therefore, I am interested in discovering blockchain technology experts' attitudes towards blockchain as a potential to improve Fairtrade certification in order to understand how they feel about the idea.

You have been approached to take part in this study because I believe your extensive range of knowledge on blockchain technology will help me answer my research question.

If you choose to take part in this study, your involvement in this project will include taking part in a 30-45-minute semi-structured interview over the phone or skype/zoom. This interview will be recorded using a phone for data collection purposes to ensure that all information is able to be transcribed from the interview.
As a follow-up to this investigation, you will be given the chance to read a transcribed version of the interview giving you the opportunity to review what was spoken about in the interview and remove any statements that you do not wish to be included in the study. If you wish to amend any changes to the transcript you will be given a timeframe of two weeks. Once the information has been transcribed it will be kept in a confidential file on my personal password protected computer that will be coded to ensure that your name is not associated with a transcribed version on your interview that will ensure confidentiality.

Participation is voluntary, and you have the right to withdraw at any stage without penalty. You may ask for your raw data to be returned to you or destroyed at any point. If you

withdraw, I will remove information relating to you. In order to withdraw from the project please send an email to celia.dyer@pg.canterbury.ac.nz. However, once analysis of raw data starts it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. To ensure anonymity and confidentiality, your name will not be included in the study and all recordings/transcribed interviews will be kept in a file on my personal password-protected computer in which I will only allow my supervisor to see. The information collected for this study will only be kept for the entirety of the study and will be destroyed of upon completion of my thesis. Any information which you approve to be a part of the research project will be included in my thesis that is a public document and will be available through the UC Library.

Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for a Master of Commerce degree by Celia Dyer under the supervision of Associate Professor Michaela Balzarova, who can be contacted at michaela.balzarova@canterbury.ac.nz. She will be pleased to discuss any concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to complete the consent form and return to me via email at celia.dyer@pg.canterbury.ac.nz.

Appendix Five – Information sheet for Fairtrade representatives

Department of Business and Law

Telephone: +64 27 2246126

Email: celia.dyer@pg.canterbury.ac.nz
30-09-2019

HEC Ref: 650.13

Investigating New Zealand and Australian Fairtrade representatives' and blockchain technology experts' attitudes towards blockchain technology as a potential to improve Fairtrade certification

Information Sheet

My Name is Celia Dyer and I am currently studying a Master of Commerce at the University of Canterbury. I am conducting my research in the field of Fairtrade and blockchain supply chains with the purpose of discovering Fairtrade representatives' attitude towards blockchain supply chains as a potential to improve Fairtrade certification. Through an analysis of the literature it has been found that blockchain supply chains have the potential to improve Fairtrade certification in a number of areas. These areas of concern include the low "fair wages" farmers are receiving, the extensive number of middlemen in the supply chain, a lack of transparency and traceability along the supply chain and the social impacts these are causing in return. Therefore, I am interested in discovering Fairtrade representatives' attitudes towards blockchain as a potential to improve Fairtrade certification in order to understand how they feel about the idea.

You have been approached to take part in this study because I believe with your passion to help improve the lives and those in the Fairtrade sector and your extensive range of knowledge will help me answer my research question.

If you choose to take part in this study, your involvement in this project will include taking part in a 30-45 minute semi-structured interview over the phone or skype. This interview will be recorded using a phone for data collection purposes to ensure that all information is able to be transcribed from the interview.
As a follow-up to this investigation, you will be given the chance to read a transcribed version of the interview giving you the opportunity to review what was spoken about in the interview and remove any statements that you do not wish to be included in the study.
If you wish to amend any changes to the transcript you will be given a timeframe of two weeks. Once the information has been transcribed it will be kept in a confidential fie on my personal password protected computer that will be coded to ensure that your name is not associated with a transcribed version on your interview that will ensure confidentiality.

Participation is voluntary, and you have the right to withdraw at any stage without penalty. You may ask for your raw data to be returned to you or destroyed at any point. If you

withdraw, I will remove information relating to you. In order to withdraw from the project please send an email to celia.dyer@pg.canterbury.ac.nz. However, once analysis of raw data starts it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. To ensure anonymity and confidentiality, your name will not be included in the study and all recordings/transcribed interviews will be kept in a file on my personal password-protected computer in which I will only allow my supervisor to see. The information collected for this study will only be kept for the entirety of the study and will be destroyed of upon completion of my thesis. Any information which you approve to be a part of the research project will be included in my thesis that is a public document and will be available through the UC Library.

Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for a Master of Commerce degree by Celia Dyer under the supervision of Associate Professor Michaela Balzarova, who can be contacted at michaela.balzarova@canterbury.ac.nz. She will be pleased to discuss any concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to complete the consent form and return to me via email at celia.dyer@pg.canterbury.ac.nz.

Appendix Six – Consent form for participants

Department of Business and Law
Telephone: +64 27 2246 126
Email: celia.dyer@pg.canterbury.ac.nz

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Investigating New Zealand and Australian Fairtrade representatives' and blockchain technology experts' attitudes towards blockchain technology as a potential to improve Fairtrade certification

Consent Form

Include a statement regarding each of the following:

- ☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand that participation is voluntary, and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- ☐ I understand that any information or opinions I provide will be kept confidential to the researcher and Michaela Balzarova (supervisor) and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library.
- ☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after the completion of the thesis.
- ☐ I understand that the interview will be audio-recorded
- ☐ I give permission for this interview to be audio-recorded
- ☐ I understand that I will be required to take part in a semi-structured interview and after the completion of the interview I will amend any changes to the transcribed interview within 14 days of the transcribed interview being sent to me.
- ☐ I understand that I can contact the researcher [*Celia Dyer* / or her supervisor [Michaela Balzarova / *Michaela.balzarova@canterbury.ac.nz*] for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☐ I would like a summary of the results of the project.
- ☐ By signing below, I agree to participate in this research project.

Name: _____Signed:_____Date:_____

Email address *(for report of findings, if applicable*)_____
Please return the completed form to celia.dyer@pg.canterbury.ac.nz

Appendix Seven – Transcriber confidentiality agreement

Department of Management, Marketing and Entrepreneurship
Telephone: +64 27 2246126
Email: celia.dyer@pg.canterbury.ac.nz

Investigating New Zealand and Australian Fairtrade representatives' and blockchain technology experts' attitudes towards blockchain technology as a potential to improve the outcomes of Fairtrade certification

Confidentiality Agreement for Transcriber

Include a statement regarding each of the following:

- ☑ I have been given a full explanation of this project and have had the opportunity to ask questions regarding my role.
- ☑ I understand what is required of me if I agree to take part in the research as a transcriber.
- ☑ I understand that I am only a transcriber of the interviews. The discussion will be completed and moderated by the researcher.
- ☑ I understand that I should not copy the recordings and use it for personal gain. It will only be used for transcription purposes.
- ☑ I understand that I should not discuss any details from the recordings or transcription with anyone except the researcher.
- ☑ I understand that I need to adhere to strict confidentiality and anonymity practices set out by the researcher. The information that I will be exposed to will not be used for any other purpose except for transcription. Analysis of the data will be done by the researcher in collaboration with their supervisor.
- ☑ I will not share any details about the focus groups and the identities of the individuals involved.
- ☑ I understand that all data collected for the study will be kept in locked and secure facilities and in password protected electronic form.
- ☑ I understand the risks associated with taking part and how they will be managed.
- ☑ I understand that I can contact the researcher Celia Dyer at celia.dyer@pg.canterbury.ac.nz or supervisor, Michaela Balzarova at Michaela.balzarova@canterbury.ac.nz, for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☑ By signing below, I agree to assist in this research project.

Name: Madeleine Dyer Signed: [signature] Date: 11/02/20

Email address: dyermadeleine@gmail.com

Appendix Eight – Human Ethics Committee approval letter

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2019/81/LR

14 November 2019

Celia Wakeman Dyer
College of Business and Law
UNIVERSITY OF CANTERBURY

Dear Celia

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled "Investigating New Zealand and Australian Fairtrade Representatives' Attitudes Towards Blockchain Technology as a Potential to Improve the Outcomes of Fairtrade Certification".

I am pleased to advise that this application has been reviewed and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 12th November 2019.

With best wishes for your project.

Yours sincerely

Dr Dean Sutherland
Chair, Human Ethics Committee